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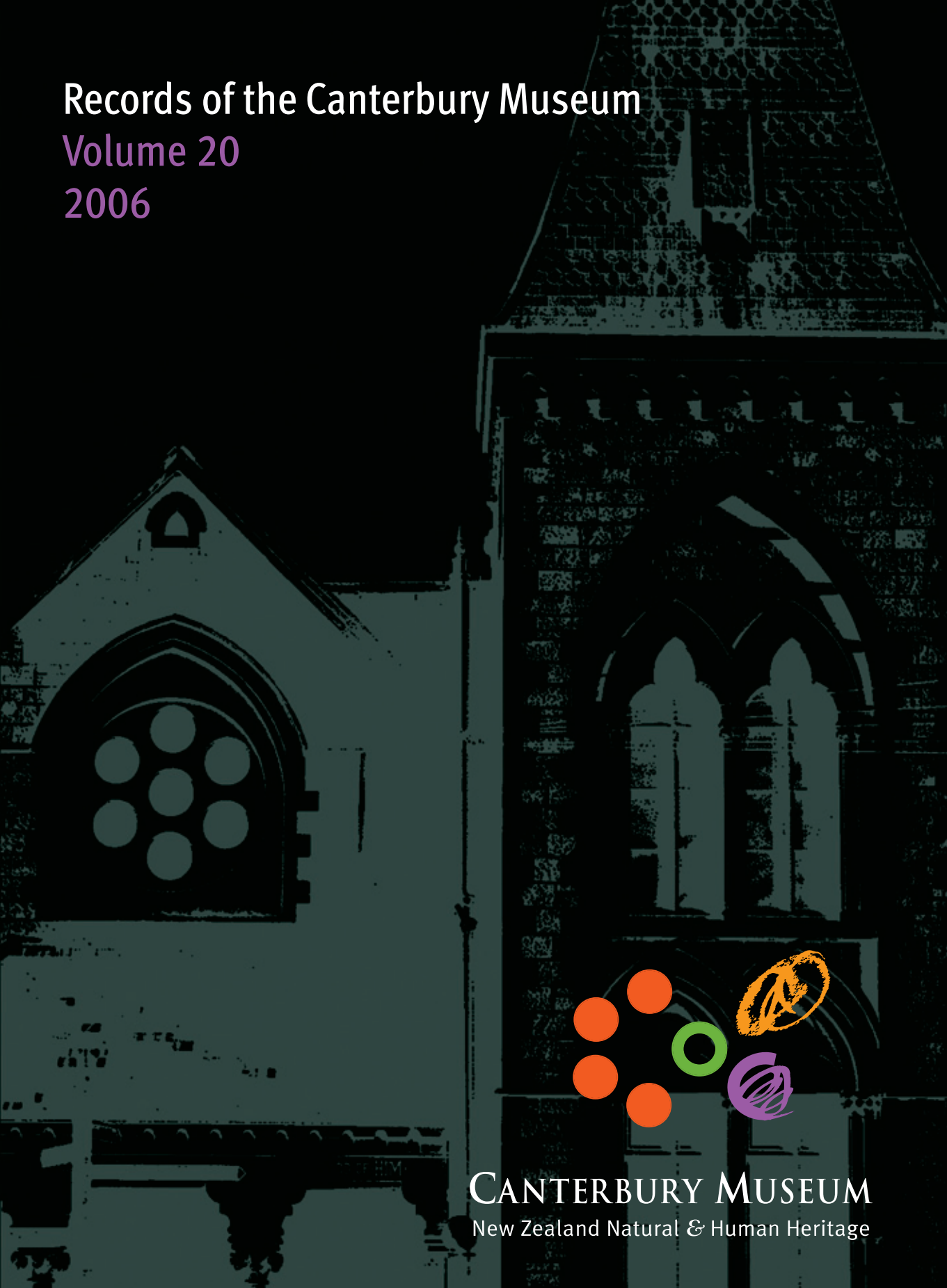

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REDISCOVERING THE ELLESMERE BOOK CLUB AND KILLINCHY PUBLIC LIBRARY

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ABSTRACT

In 1964, the book stock of Killinchy Public Library, some 250 items, was gifted to Canterbury Museum. Records accompanying the books contained mainly anecdotal information and conjecture and did not provide full details of the life of this rural Canterbury library. This paper describes the precursor to the library, the development, management and funding of the library and suggests reasons for the eventual closure and disestablishment of the library resulting in the donation to the museum.

The precursor of the rural public library and the interloan system was the Ellesmere Book Club and Lending Library. For both the book club and the public library the most important factor was the ongoing community involvement and commitment to establish, operate and maintain a reading service. This commitment arose from the recognition of the important part the library played in the social and educational life of the small rural community. The library collection held at Canterbury Museum is a tangible reminder of the importance of rural libraries to their communities from the mid-1800s until the mid-1900s.

KEYWORDS

Killinchy; Ellesmere; Ellesmere Book Club; Country Library Service; Killinchy Public Library

INTRODUCTION

The history of Killinchy Public Library is inextricably intertwined with the social life of Killinchy and its connections to the nearby Ellesmere townships of Leeston, Doyleston, Brookside and Irwell. Community leaders were involved in activities that affected development of the district. Without this feeling of community obligation, neither the Killinchy Public Library nor its precursor, the Ellesmere Book Club and Lending Library, would have existed.

Killinchy is situated almost equidistant from Leeston and Doyleston in the Ellesmere/Selwyn District of South Canterbury. The first land claim there was granted in 1865 to William Shaw (died 1897), who arrived in New Zealand from Killinchy, Ireland. The area was named after Killinchy in County Down, Ireland by one of the first settlers in the area, George McClure (1840 – 1918). McClure arrived in New Zealand aboard the *Matoka* in 1860 and after a few years purchased a farm near Leeston. He named it Grasslands and lived there with his wife, Susan Hogg (d.1908), until his death. Five of their nine children remained in the district. Both Susan and George are buried in Killinchy Cemetery. [1]

Today, Killinchy is a tiny settlement comprising a hall and tennis court, a cemetery, a dairy processing unit and several farms. There is no church, no public house, no school, no shop, and no "town centre". Killinchy is literally a spot on the road surrounded by signposts pointing the way to Killinchy with no sign to indicate that you have actually arrived. However, during the period of peak activity of the public library at Killinchy, the situation was very different. In 1903, Killinchy included a post office [2], a blacksmith, an Anglican Church, a public library, a community hall and a school. It was considered to be a thrifty, prosperous district. [3]

ELLESMERE BOOK CLUB

Incomplete records exist showing the development of the Killinchy Public Library. Books were valued by early settlers for recreation, education and as a social medium for interaction between people. Many community libraries began with personal collections in private homes and books were circulated by the home owners to readers in their communities. This had the benefit of sharing the costs of books, which were beyond the reach of many smaller rural farmers, as well as encouraging social activities as people visited each other to exchange books.[4] In a similar way, the public libraries in the Ellesmere District were preceded by the Ellesmere Book Club, active in the 1860s – 1870s. The popularity of this club may have been a catalyst for the establishment of more formal public libraries. The Reverend William Bluett and Mrs Fanny Bridge are the main sources of information concerning the Ellesmere Book Club.

The Bridge family letters were written by the family of Charles and Fanny Bridge, who resided at Homebrook, Southbridge. They date from 1854, when the family was on board ship travelling to New Zealand, and finish in early 1871, when Fanny Bridge left for a visit to England. The letters relate the life, interests and community activities of the family, especially the women.

The Reverend William James Jefferand Bluett (1834-1885) was one of the best known settlers in the Ellesmere District. He arrived in New Zealand on the *Tudor* in 1865, along with a prize-winning purebred cow from which he hoped to breed.[5] He purchased land between Southbridge and Leeston, called Holecombe, and became the minister at St James Church, Southbridge as well as All Saints Church, Burnham. Bishop Harper consecrated the Southbridge church in 1866 having chosen William Bluett as a clergyman suitable for Canterbury, New Zealand. This was not to be the case as is evident by the comments and tone in the Bridge letters.[6] It seems that Reverend Bluett objected strongly to visiting his parishioners, an attitude met with disfavour by Fanny Bridge who commented that,

> "…in these scattered districts where it is simply impossible for many of the people to come to church, the services are less than half of the clergyman's real work."

She went on to say that the parishioners

> "…say they do not like subscribing for a clergyman whom they never see."[7]

However, Reverend Bluett did take an active part in those community groups and activities that interested him, primarily relating to the dairy industry and local politics. He was chairman of the Ellesmere Book Club[8], as mentioned in the Bridge letters where Fanny Bridge described the latest books she had received from the club.

The club was based at the Bridges' home and the books were lent on a round robin system, with Fanny Bridge keeping the lending records.[9] Reverend Bluett is said to have put the club on a formal footing but Fanny, in letters to family members, talked of swapping books before the club was officially started. As Reverend Bluett was an itinerant minister, he was responsible for transporting the books to be exchanged throughout the various settlements he visited as part of his parish responsibilities.

After settling in Southbridge, Fanny Bridge ordered books for her personal library from Sydney via two bookshops in Christchurch.[10] Her first mention of an order was in 1867. This book order was mentioned in a typical letter in which Fanny Bridge detailed her activities, including teaching at both the church Sunday school and the regular day school. A letter in November 1867 mentions a church service at the school, causing the school day to finish early to accommodate the congregation. The Reverend Bluett was preaching, and Fanny Bridge comments that he "preaches such common-place sermons".[11] Later in the same paragraph she mentions the delay in beginning a lending library service. She states that Reverend Bluett wished to delay the start of the lending library until he had shifted into his new house. From the context, it seems that the library was to have been based in his house, or possibly in part of the church. The lending library appears to have been a formal extension of the book club and a mid-point between the book club and the formal establishment of the Killinchy Public Library.

By 1868, the lending library had been formally established as Fanny Bridge recalls a school treat where Reverend Bluett handed out prizes for school examinations and advertised the lending library.[12] As a result of his speech, two of the workers on his estate borrowed books, *Wood's Natural History* and the *Memoir of Mr John Davies*. The enthusiasm for the library is shown through the request by the men to be able to recommend books for acquisition by the library. Recommendations were passed to Fanny Bridge who would then try to acquire the items. The lending library books were held by Fanny Bridge, presumably at her

home[13], and could be borrowed for a subscription of 2s 6d per quarter.[14] Children also subscribed to the library; however, it is unclear if they had to pay a subscription fee.[15] Community members lent copies of their own books to the library and it appears that much of the "book stock" was not owned by the library but rather rotated around the community until finally returning to the original owners. The community had active input into the library in other ways, including working bees to make covers for the books.[16]

Fanny Bridge provided comment about the books available and who borrowed particular books. She expressed surprise that men were interested in *Home Truth Sermons* but decided it was because they were written in "a lively style".[17] The library included books containing pictures to be used to learn art skills, children's books such as *Jack the Giant Killer*, which she described as a "pretty story", and women's books like *A Woman's Kingdom*. Some of the books were obtained from the National Society Depot in Christchurch,[18] while district residents obtained others when they travelled to Christchurch. Fanny Bridge made lists of the desired books for travellers to collect, or to send back by book post. She commented in 1868 that book prices in Christchurch were decreasing, specifically citing *Scott's Poems* at a cost of 7s 0d.[19] In 1870, Fanny Bridge recorded a pleasant time spent at the chief bookseller's shop in Christchurch, where she chose books for the school, apparently paid for from library subscriptions. She also obtained books to be sold in the store at Southbridge as a fund raising venture.[20]

The book club/lending library idea may have faltered during Reverend Bluett's tenure, as he did not fulfil his duties in regard to visiting members of his allotted parish.[21] When William Bluett resigned from his cure in 1871, it was much to the relief of some of the congregation.[22] The irregularity of book exchanges appears to have been a catalyst for the movement by the Killinchy community for a permanent library of their own. As the Ellesmere Book Club and lending library circulated books throughout the Ellesmere District it may also have been the starting point for other public libraries in the area, such as at Brookside and Irwell.

THE KILLINCHY PUBLIC LIBRARY AND LINKS TO THE KILLINCHY SCHOOL 1871 - 1891

The Killinchy Public Library appears to have moved location over time. Records for the early days of the library are fragmentary until 1891. Initially, books remained stored in the Bridges' house until a separate building was completed around 1871. The library and hall appear to have been in a separate building situated beside the school, on a half acre of Killinchy Town Hall Company land owned by the church. Confusion regarding the location of the library book stock is the result of the public library and the school being established around the same time and many of the same people appearing on the organising committees for both institutions. This is not surprising in a small rural community.

The Canterbury Provincial Council return for 1871 showed the number and names of all district schools brought under the *Education Ordinance* of 1871. Nine new schools were established in Canterbury, including Kowai Pass, Selwyn, Waihi, Weedons, West Melton,[23] and Killinchy.[24]

Killinchy was quick to form a committee and build a school. Committee members were elected annually at a householders' meeting in Killinchy and could be re-elected each year if the residents had confidence in them. The meetings were announced via advertisements placed in the *Ellesmere Guardian* newspaper.

Government funds were also made available in the 1870s to establish public libraries, including those in rural areas. To obtain governmental monies, library committees had to apply for grants and specify how the money would be used. The bulk fund was apportioned according to the needs of the various institutions and their priority order as perceived by the Provincial Council. The amounts granted could be altered to suit the circumstances of the petitioners.

In addition to building works, the Provincial Government set up a scheme whereby books could be obtained at a moderate rate for public libraries.[25] The books were provided to the libraries at cost price, with no expenses or profit being added. [26] Book catalogues were sent to all library committees who could then choose books to twice the value of the subsidy granted to them. The Education Board supplemented the library contributions on a £1 for £1 basis.

Thomas Tolerton (1836-1907) came to New Zealand from Ireland and purchased land in Killinchy where he farmed for over forty years. Active in the Church of England, he was chairman of both the Killinchy Public Library and school committees.[27] Tolerton was also the treasurer of the Killinchy Dance Committee, which aimed to raise money for the public library.[28] Other public duties included participation in the Killinchy Football Club and the Draughts Club. Both clubs used the Killinchy Library room as their committee and meeting room, paying subs to the library committee. Edward Earle (born 1841) was elected to the Killinchy Library committee in 1871, and became chairman for 1871 and 1872 and again in 1880.[29] In 1875, the Library Committee investigated the amount that the government would provide for the building of a separate library room as all book stock appears to have been stored in the schoolroom.[30] It is unclear if they received this grant.

In Killinchy, Thomas Sherratt, a member of the Canterbury Education Board, placed an advertisement in the *Canterbury Times* in 1876 announcing a list of all the people who had promised money to go into a fund towards the erection of a library room. The total amount promised for the library was £45.0s.0d.[31] This was the only advertisement discovered relating to funds for building a library. Thomas Sherratt also asked for a complete catalogue to be created of all books belonging to the library,[32] which could then be shifted into the new building. These books included some from the original Ellesmere Book Club and Lending Library that were donated by individual owners.

In 1876, the Provincial Council voted to set aside £1500 for distribution over all district schools to be spent on book supplies. [33] Of this, £10 was allotted to Killinchy for 'sundries', including books which appear to be part of the public library stock.[34]

The *Public Libraries Subsidies Act* was tabled in 1877. At this time, a sum of £5000 was set aside to share among all New Zealand education boards for use by public libraries. Canterbury's share was £1068.17s.0d.[35] Killinchy Library took early advantage of this fund and received a government grant in 1878, of £4.16s.2d specifically to purchase books. This was the first government grant received by the library making it likely, that Killinchy Library was established and supported primarily through community rather than government monies. The grants were only available until 1887.

Killinchy Library bought other books independently of the Education Department and government grants. These were funded by donations[36] and personal subscriptions from the library users. Like other rural libraries, it is likely that Killinchy Library committee used booksellers to purchase the books and received a 15% discount on the items because they were a public library. [37]

Walter Tipler (1842-1906) took charge at Killinchy School from 1889[38] to 1903 at the peak of its roll, recorded as 160 pupils. Tipler took a very active part in community activities, including the Rugby Football Club, Draughts Club, School Committee, Library Committee, and acting as librarian in the Killinchy Public Library. In 1891 and 1899, more repairs, additions and renovations were carried out requiring the school to close for a time.[39]

Children were permitted to subscribe and use the public library and in 1891 children had been issued books 259 times since the library's inception.[40] It appears that the school used the public library as its school library. It is unlikely that there would have been a public and a specific school library situated close to each other in a small community like Killinchy.

THE KILLINCHY PUBLIC LIBRARY 1891 UNTIL THE 1950s

The fortunes of the Killinchy Public Library fluctuated over the years. As the financial records for the library prior to 1891 are lost, it is not known if the library received government subsidies. The only mention of the library in the 1891 *Ellesmere Guardian* related to a meeting of the vestries of the parochial district of Ellesmere held in the public library room. This article also stated that Killinchy had "just passed through a phenomenal year of successful finance",[41] which presumably would include the public library accounts.

In 1892, Mr M O'Brien was chair of the Killinchy Library Committee annual meeting that discussed the issue of the lack of subscriptions from the Killinchy residents who were members of the library. The library membership numbers decreased in this year to the disappointment of the committee members. Walter Tipler acted as librarian and in the minutes of the meeting expressed disappointment that there were so few readers for a "library second to none in Canterbury".[42] The minutes mention that the main subscribers and users of the library were mature residents and that the library needed to be recommended to the younger people. The rationale given for this was that,

> "…reading the best books of the best authors would keep young people well abreast of modern and intelligent thought so as to fit them for the stern realities of life."[43]

As well as subscriptions, Killinchy Library gained money by leasing out the library room and through fundraising activities. The library room was leased to the Killinchy Rifle Club from 1882 and they paid a yearly rental in advance of £4 for the use of the space. The Killinchy Rugby Football Club rented space from 1894.[44] This was organised by the rugby club chairman, Walter Tipler who was also the librarian and president of the[45] Killinchy Draughts Club that used the library from 1897.[46] Additional funds were raised when the Draughts Club held competitions with the Southbridge Draughts Club.

Fundraising activities for the library included holding dances in the library room, with the ticket price going to support the library.[47] These dances included classes put on during summer months. The receipts for 1897 totalled £7.10s.1d and expenditure came to £2.13s.2d. Entertainments were also held at the school and in the library to raise funds for the Anglican Church.[48]

Thanks were given, at the annual meeting for 1897, to the *Ellesmere Guardian* for supplying a copy of the paper free of charge to the library. Thanks were also directed at the librarian, Walter Tipler, for his efforts during the previous year. At this meeting, it became clear that there was an arrangement with the Brookside Public Library to share books between the libraries. The intent was to enlarge the variety of available reading resources without increasing the costs to the library. A motion was passed at this meeting that the turnaround of books between libraries should be at six-week intervals. It was mentioned that a pile of Brookside books had been waiting to be picked up for nine months.[49] This lending system between libraries is akin to the lending library system developed through the Ellesmere Book Club, and is the precursor of the Country Library Service and the modern interloan system.

The fortunes of the Killinchy Public Library took a downward turn in 1898. Thomas Tolerton, chairman of the committee, expressed unhappiness at the small attendance at meetings and expressed a desire that the library be reinvigorated in order to raise funds and increase support. Notes to this meeting say that the library was used by young men, who were not subscribers, for social gatherings and a view was expressed that the library should be kept for subscribers' use only. The interest in and subscribers of the library had decreased to the point where the annual accounts showed a deficit of £1.8s.11d with total incoming subscriptions of only £1.0s.8d. These subscriptions came from a total of six subscribers. As there were four officers on the library committee, it may be assumed that the only subscribers were the officers and members of the committee, rather than residents of Killinchy district. The subscriptions for 1898 were the lowest in the history of the library to that date.

While the draughts and rugby football clubs continued to use the library room, the committee treasurer noted that no money or help was offered in 1898 in exchange for use of the room. The library room was in disrepair and no money was available for maintenance. Walter Tipler resigned as librarian, saying that while "…the duties had afforded him much pleasure", due to the decrease in subscribers and users over the previous two years the office of librarian had become redundant, as there was now "nothing for the librarian to do."[50] The few duties of the librarian's office remaining were added to those of the secretary of the committee, Mr D O'Brien (d 1897),[51] who was a past president and founding member of the library committee.[52]

Government grants were re-established in 1899 for free public libraries. The Ministry of Education defined a public library as one that,

> "…belong[ed] to the public, and of not being under the control of an association, society or club, whose membership is composed of a section of the community only, and if within a borough it must be open to the public free of charge."[53]

The amount distributed to each library was determined by the income the library received from rates levies or community subscriptions and voluntary contributions. The allocation in 1899 for the Canterbury region was split between 60 libraries, including four in the Ellesmere area.[54] Killinchy was not included.

At this time according to the Killinchy Library issue/minute book, the library was fully funded for book purchases by public subscription and in addition 30 books were exchanged with Leeston Library to provide new stock. This is despite Killinchy Library meeting the subsidy provision of the minium subscription amount of £2.0s.0d per year and rates requirements allowing them

to obtain Ministry of Education funding.

By 1904, the number of libraries in New Zealand that shared the subsidy had risen to 396, showing the value placed on library services by communities. Killinchy Library accounts show receipt of money from the government subsidy over the next two decades.

At the annual meeting of the Killinchy Library subscribers in 1905, with Thomas Tolerton presiding, the year's accounts were tabled. The library received £28.13s.4d for the 1905 year, and had costs of £11.2s.5d. The credit balance for the library funds was mainly due to funds raised from the dance classes held in the library during summer. The dance classes were established by William John Lemon Junior, secretary of the dance committee.[55] At this meeting, a motion was passed to extend the dancing classes through the winter on a fortnightly basis as the dances were so popular and such a good revenue earner.[56]

There was also a government subsidy account, which was available for purchasing new books. Thomas Tolerton considered 1905 to have been the most successful year up to that time for the library.[57] A committee to purchase new books was established under the leadership of Mr J F O'Brien, son of past chairman Mr M O'Brien.[58] The *Ellesmere Guardian* for 2 May 1905 gave a description of the annual meeting of library subscribers, including mention of the library being enlarged and renovated. Other improvements to the library and attached hall were suggested, including having the surrounding hedges trimmed, and the inside of the hall painted. The library in 1905 had revenue of £54.8s.7d and spent £13.14s.5d. Two librarians were appointed, Mr T Allen and Mr A Adams. Miss Selina Warnock was acknowledged for her services to the library and her donation of new books. A sub-committee was elected to purchase new books using the credit balance in the accounts.[59] A decision was made to spend £6 on magazines.

In 1916, two new librarians were appointed, Mr S Allen and Mr W Lowery. The committee voted to spend the government subsidy of £9.10s.0d on new books and magazines. Two-thirds of the sum was to be spent immediately and the other third held over for later purchases. One agreed purchase was the continued subscription to the *New Zealand Farmer* magazine. Three other unnamed magazine subscriptions were approved. A building fund was set up with some of the credit balance with the idea of building a new hall situated close to the old hall and school. As a fundraising exercise, monthly socials were to be held in the library over the winter months.[60]

In 1917, the credit balance in the library accounts had risen to £48.8s.3d, of which £10 was set aside to be spent on books and magazines. The purchasing subcommittee consisted of Mr W Chappell, Mr J Stevens and Mr M O'Brien. These men were respectively chairman, secretary and treasurer of the library and hall committee. Mr T Allen and Mr A Adams were re-appointed as librarians. Money was also set aside to purchase two more tables designated for playing cards.[61] In 1917, Doyleston, Lakeside, Leeston, Southbridge and Killinchy in the Ellesmere District qualified for subsidies,[62] as they exceeded the minimum required from public subscriptions.

The library continued to be financially sound, with revenue gained from members' subscriptions, government subsidies, rental from the hall room to community groups, revenue from dances, and official activities such as the general election. During WWI, the total amount of money available as subsidy was reduced to £2500 as money was needed for the war effort. The grants were only given to libraries in communities that had less than one thousand inhabitants as they were seen as in more need than libraries with a larger subscriber base. Members' subscriptions fell to £2.15s.0d in 1916-17 and £3.6s.3d in 1917-18 while the major rental of the library and hall was from Red Cross activities relating to the war effort. The library remained solvent during WWI by using accumulated funds from the post office account. The end of the war was marked by rents received from the welcome home committee and the welcome home dances they organised. Six dances were held in the 1919-20 financial year.[63]

In the 1920-21 financial year, 69 new books were purchased, paid for by government subsidies and subscriptions. At this stage it appears from insurance documents that the library and community hall were in the same building although funded from separate post office accounts.[64] In 1923-24, the library was still financially sound although subscriptions only contributed 20% of the total revenue. The balance at the year end was £82.15s.9d. By 1923 – 24, the library and hall account was in debit by £51.0s.2d. The main reason for the financial shortfall was the need for repairs to the hall, library and surrounding grounds, as well as an increase in insurance premiums. It appears that the building lacked maintenance during WWI. A hall improvement fund was established in 1923-24, to which

the library post office account contributed money. Improvements included installing electric lights in the hall and library. In 1923-24, over £138 was collected through individual donations for the hall, library and electric light improvements fund. An additional £21.12s.0d was raised through dances and socials. 1923-24 was the main fundraising push, as in 1924-25 the subscriptions collected amounted to only £3.12s.6d and dances raised £32.13s.3d.

An additional cost to the community at this time was the required rebuilding of the school. In 1924, the school committee and school inspector deemed the building too old and decayed for renovation and not suitable for school purposes. An application was lodged with the Education Department to rebuild a school, for 78 pupils, at an estimated cost of £2275.10s.0d.[65] The school was rebuilt in 1925 [66] close to the library and hall building. The school continued to use the public library as their school library and the architect's plans for the new school do not include a specific library space.

Between 1925 and 1928, the library book stock continued to grow with £46.8s.10d spent on new books. In 1927-28, subscriptions were obtained to build a supper room and enlarge the public library. A total of £49.9s.0d was collected from 46 people. Additional book stock[67] in these years came from a donation by Selina Maude Warnock (1873–1956) who taught at the school[68] and was head teacher from 1903 to 1926.[69]

From1930 to May 1938, libraries did not receive government subsidies and were expected to survive unaided. Between 1929 and 1931, the Killinchy Library accounts ran into debit as outgoings for building improvements, maintenance and management of social activities did not meet income from the use of the hall and library, requiring a bank overdraft to be obtained. In these years, no new books were purchased. To compound the financial problems, the amount of subscriptions collected from members declined to under the £2 minimum requirement to qualify for government subsidy.[70] This period of difficulty came at the beginning of the depression of the 1930s when farmers in particular struggled to make ends meet.

A variety of clubs continued to use the library and hall building including the rifle, tennis and rugby clubs and a bible studies group. By 1933-34, the library was again in the black financially and 20 new books were purchased and use of the library increased. While still used for social activities, it was also used for meetings of the Democratic, Labour and National political parties, school socials, the Women's Institute and the Patriotic Committee supporting New Zealand's involvement in WWII.[71]

Membership subscriptions continued to decline to £1.5s.0d in 1934-35 and the library account was still paying off the overdraft. In 1937, the library account was in credit by £9.5s.7d in contrast to the 1924 balance of over £84.

In May 1938, the Country Library Service was started[72] as a result of the government-initiated *Munn-Barr Report on New Zealand Libraries*, written in 1934. The main thrust of the report was on using the resources available as efficiently and cost effectively as possible. The service was a means whereby public libraries and rural residents could gain loans of books from a central repository. The book loans were charged for at the rate of £4 per fifty books. These fifty books were intended to be the initial book stock for the library and would be replaced with new books over time. Public libraries could also ask for and receive help in the management of the library. In 1938, apart from subscriptions to newspapers, the Killinchy Library only obtained new book stock from the Country Library Service, paying a fee for the service. The library account was again in debit.

With the start of WWII, groups renting the building were predominantly war related with the Red Cross, Patriotic Committee and Women's Institute all using the library and hall. The Country Library Service continued to be used for new book stock. Killinchy Library received £0.5s from the Country Library Service in 1940-41 and in 1942-43 paid the service £0.5s for a lost book.[73] At this time, the Killinchy Library members' subscription changed to a reading subsidy, presumably charged only on books borrowed rather than to remain a member of the library. The reading subsidy in 1942-43 was £1.10s.0d while the Country Library Service charges were £3.5s.0d meaning the library ran at a loss. This was compounded by increased insurance charges, which now included a war damage charge. Apparently, library use continued to decline and by 1945-46 total reading subsidies amounted to only 15s.

The hall and library building was still actively used for social occasions, particularly weddings, birthdays and welcome home socials for returning soldiers. The amounts charged for the use of the building had not altered for a number of years while expenses incurred had risen. Thus the accounts for both the hall and the library continued to either just break even or be in debit.

In 1949-50, the library experienced a surge in use with £5 taken in reading subsidies. This increase did not however cover the concurrent increase in Country Library Service charges, which for the same year amounted to £8.2s.0d.

In 1951, additional subscriptions were asked for and obtained to repair and repaint the library and hall buildings. A total of £103.15s.0d was raised. Gathering regular readers' subscriptions was still difficult and in 1958, in an effort to increase membership and readers and to ensure the subscriptions were paid, Mr W Ilraith and Mr M O'Brien personally collected subscriptions from library users. They collected a total of £7.2s.6d. For the first time in years the subscriptions collected exceeded the charges for the Country Library Service, which in this year totalled £4.10s.0d.

By the end of the 1950s, Killinchy could no longer support a library or a school. Easy transportation to larger centres such as Leeston and Southbridge meant that services were centralised. The school was closed in December 1959 due to lack of pupils and the growth of Leeston and Southbridge as the main centres in the area. The Education Department retained an area of land with a bus garage on it for transporting the remaining pupils to schools at Leeston and Southbridge.[74]

Although the school closed in 1959, the Education Department did not take steps to dispose of the land and buildings until 1963[75] when residents of Killinchy District elected a committee, with Mrs S J Lemon as secretary, to take over control of the school buildings with agreement for responsibility for all repairs, expenses and maintenance.[76] The library appears to have closed at the same time as the school. The hall and library building had fallen into disrepair and the library room portion was demolished. The magazines and newspapers appeared to have been destroyed or given away at this time as no record of them remains. The books were stored in boxes under the stage of the hall and were essentially forgotten. They were rediscovered in the early 1960s when the hall was demolished after it lost a wall during high winds. The book stock was donated to Canterbury Museum in 1964, and in 1966 the unused school building became the community hall.[77]

CONCLUSION

Killinchy Public Library was set up during a period of establishment and growth in rural communities in Canterbury. The Killinchy settlers showed innovation in establishing and managing a library primarily through community fundraising, rather than relying on government grants and subsidies and being constrained by the associated restrictions or conditions. The library was an integral part of the community, playing an important social role as a venue for dances, weddings, clubs, societies and official committee meetings. New Zealand changed rapidly over the 80 years of the library's existence. The library's lifecycle reflected both major social upheavals, such as WWI, WWII and the 1930s' depression, and changing social trends, for example centralising services, and developing technologies like public transport which made travel to bigger centres more viable.

The ongoing costs associated with maintaining a library, including building maintenance, library services, and purchase of stock, became too much for the small Killinchy community. In addition, the availability of both school and library services in nearby Leeston and Southbridge, meant that by the end of the 1950s the library was no longer viable or supported. This demise marked the beginning of a new era of urban-based centralised library and educational services.

Perhaps the significance of the Killinchy Library collection lies in its associational value. The history of the Killinchy Public Library tells part of the story of a community, the activities of the people within the community and provides insight into the settlement of rural Canterbury over an 80 year period.

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DETERMINING THE ANTIQUITY OF THE CANTERBURY MUSEUM MUMMY, TASH PEN KHONSU

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ABSTRACT

Egyptologists consider the Egyptian mummy Tash pen Khonsu held at Canterbury Museum to be from the late Ptolemaic Period (ca 150 BC). Two sets of radiocarbon dates from the linen body wrapping and the linen sarcophagus lining show that the sarcophagus is significantly older than the mummy. These surprising results question the authenticity of the relationship between the body and the named sarcophagus.

KEYWORDS

Radiocarbon dating; Egyptian mummy; Canterbury Museum

INTRODUCTION

The inscriptions and decoration of both the sarcophagus and the body cartonage of the mummy Tash pen Khonsu (EA1989.13) suggest that she was from the late Ptolemaic Period of Egyptian history, ca 150 BC (Dennison 1999; Hutton 1895, 1900; Price 1893; Sullivan 1999; Waite 1906).

Obtaining accurate dates for the mummy and sarcophagus was an important part of a larger research project that examined the medical and social history of Tash pen Khonsu (see Dennison 1999). In March 2003 a sample of linen cloth from the mummy wrapping (Fig. 1) and one from the cloth lining of the sarcophagus base were taken for radiocarbon dating. Wood from the body of the sarcophagus was not sampled for two reasons, (1) it may have affected the appearance of the sarcophagus (2) 'in built' ages of wood from mature trees may have given a date older than the true age. Linen samples could be taken with minor visible intrusion and the subsequent radiocarbon analysis was likely to give an accurate date.

SUMMARY OF RADIOCARBON DATING

Both samples taken in 2003 were divided into three sub-samples, each of which was individually radiocarbon dated by accelerator mass spectrometry (AMS) at the Rafter Radiocarbon Laboratory, Institute of Geological and Nuclear Sciences, Lower Hutt, New Zealand. The weighted mean, of these three conventional radiocarbon ages (CRA), for each sample was taken for calibration to calendar years.

Because the radiocarbon dates for the samples from 2003 gave the unexpected result that the sarcophagus was older than the mummy, two additional samples of linen from the sarcophagus and mummy were sent to the Rafter Laboratory in July 2005 for dating (see Table 1). The calibrated age interval for the two sets of samples is shown in Figure 2.

DISCUSSION

Radiocarbon dating shows that the linen on the sarcophagus base and lid is significantly older than the linen used to wrap the mummy. There are three possible explanations for this: (1) the well preserved mummy in the sarcophagus replaced a poorly preserved original, prior to being sold in Egypt in the late nineteenth century. A well preserved mummy in an elaborate sarcophagus would have been sought after and would have got the best price. Possible support for this scenario comes from the fact that there was no jewellery with the mummy, although the hieroglyphic inscriptions on the sarcophagus indicate that Tash pen Khonsu was a woman of substantial means (Dennison 1999; Sullivan 1999). However, the excellent fit of the cartonage and face mask to the body and their stylistic integrity with the sarcophagus (Sullivan 1999) makes the 'body-swap' scenario less likely. (2) The sarcophagus was opened and the body re-wrapped after it was originally mummified, which could explain the younger age of the mummy linen. (3) The mummy was placed in an

TABLE 1
Radiocarbon dates. The mean CRA was calibrated to calendar years by the Rafter Radiocarbon Laboratory.

Laboratory code	Sample identification number	Year dated	Material	Conventional radiocarbon age (CRA) 14C years BP measurements	Weighted mean CRA	Calibrated age (BC) in terms of 2 sigma confidence intervals
NZA 17157	R28174/1a	2003	Linen body wrapping	2207±40 2170±40 2199±45	2190±25SE	363 BC — 172 BC
NZA 17158	R28174/2b	2003	Linen from sarcophagus base	2485±40 2446±40 2513±40	2480±23SE	775 BC — 419 BC
NZA 22725	R28922/1	2005	Linen body wrapping	2156±40	--	361 BC — 55 BC
NZA 22726	R28922/2	2005	Linen from sarcophagus lid	2474±30	--	768 BC — 411 BC

Figure 1. Sampling the linen cloth body wrapping for radiocarbon dating.

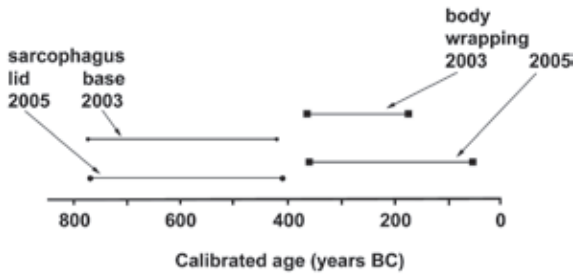

Figure 2. Calibrated age ranges obtained for linen samples from the sarcophagus lining and body wrapping of Tash pen Khonsu.

older coffin that was recycled to accommodate Tash pen Khonsu. Although, conservation reports for the coffin base and lid did not mention any obvious evidence of this, such as over-painting (Ng 1998; Schroeder 2001), these examinations were carried out before the results of radiocarbon dating were known. However, the fact that Tash pen Khonsu had her pelvis crushed in order to fit into the sarcophagus (Dennison 1999) is good evidence that an older coffin was recycled. This would explain why the linen in the sarcophagus is older than the linen the mummy is wrapped in. Radiocarbon dating of the mummy skeleton and tissue and x-ray analysis of the sarcophagus would provide more evidence for this scenario being the most likely explanation.

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THE PROVENANCE OF THE CANTERBURY MUSEUM MUMMIES

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ABSTRACT

As part of a research project focussed on the Egyptian mummy Tash pen Khonsu (EA1989.13) a complete re-evaluation of the details surrounding provenance and acquisition by Canterbury Museum in 1888 of two mummies was carried out. A number of fundamental problems with the existing museum records were identified and all known related documents were located and re-examined. This process has now finally established where, when and how each of the mummies was obtained.

KEYWORDS

Egyptian mummies; collectors; provenance; Canterbury Museum

INTRODUCTION

The first inventory record of the Egyptian mummies in Canterbury Museum appears in an old accession register, Contributions to the Canterbury Museum 1884-1891 (Canterbury Museum Ms. 1/1). Entry 3876, dated June 1888, states "Mr John Tinline, Amuri, Two Egyptian Mummies and collection of Assyrian and Babylonian Tablets." No further provenance or acquisition details are provided by this document. However, evidence from later documents clearly reveals Tinline's only involvement in the acquisition to have been financial.

John Tinline (1821-1907) had farming interests in Marlborough and was a member of the Nelson Provincial Council 1857-60. In retirement he is recorded as having engaged in philanthropic activities (Scholefield 1940, p. 386). Tinline was credited with having presented the mummies to Canterbury Museum because of £50 he gave to the Museum in 1886. This contribution was to assist the first director, Julius Haast, to obtain collection items while he was travelling in England and Europe in his capacity as a New Zealand Commissioner at the Colonial and Indian Exhibition, London in 1886 (Haast 1948, p. 966).

The first catalogue card entries, which commenced in 1914 and also doubled as display labels, conveyed more provenance details, but the same acquisition information (Burrage 2002, p. 98).

The entries read:

A.R. 1001.0 Female Mummy named Ta Seps Pen Chonsu. Ekhmeem, Upper Egypt. Ptolemaic Period, about 150 BC Pres. John Tinline.

A.R. 1001.1 Female Mummy probably 18th Dynasty. Before the exodus of the Hebrews, about 1500 BC Pres. John Tinline.

[The A.R. prefix indicates the items were part of the Antiquities Room collection.]

A.R. 1001.1 was subsequently exchanged with Auckland Institute and Museum in October 1957 for three Oceania ethnographic items (Canterbury Museum Accession Number 120/58).

A.R.1001.0 was retained by Canterbury Museum and re-catalogued EA1989.13 (Canterbury Museum Foreign Ethnology Register No.4). This catalogue entry states that

> "… there is a description of this mummy in the *Transactions of the Society of Biblical Archaeology* IX, 1893, but no indication as to how it came into John Tinline's possession. This record says there were 21 ushabti figures in the coffin but there are only seven; four at the head, three at the feet."

This catalogue entry misses perhaps the most important piece of information contained in this article — that it was in fact written by Frederick George Hilton Price, describing items from his own personal collection of Egyptian antiquities.

Price (1842-1909) was an English banker and antiquary; his collection of Egyptian antiquities was described as 'very numerous and choice', many of them he himself described in the *Proceedings of the Society of Biblical Archaeology*, and the whole collection was

catalogued in sumptuous privately-printed volumes (Dawson and Uphill 1972, p. 237).

Evidence that the mummy described by Price is the one obtained by Canterbury Museum is supported by the fact that the article by Price (1893) is later directly copied to describe the mummy (A.R.1001.0, EA1989.13) in Hutton (1895, 1900) and Waite (1906).

A further source of confusion surrounding the details of the provenance of the mummies is created by a reference in the biography of Sir Julius von Haast stating, "Through Giglioli, he arranged to have two Egyptian mummies sent to Christchurch from Cairo" (Haast 1948, p. 967).

In 1886, when the mummies were obtained, Enrico Hillyer Giglioli (1845-1909) was Professor Ordinario de Zoologia e Anatomia Comparata dei Vertebrati and Direzione de Museo Zoologica dei Vertebrati at the University of Florence (G Coffini, Rome, pers. comm. 1998).

Haast and Giglioli were regular correspondents and collaborated on numerous exchanges between Canterbury Museum and the collections at the University of Florence. But it is established below that Giglioli's involvement was only peripheral to securing one of the mummies (A.R.1001.1).

The confusing and conflicting records concerning the provenance of the Egyptian mummies seems to have been precipitated by the untimely death of Sir Julius von Haast. Haast returned from England and Europe and was back at work in the museum on 23 July 1887 but died unexpectedly on 16 August 1887, prior to the arrival and documentation of the collections he had obtained while overseas.

SOLVING THE PROBLEM – FOLLOWING THE DOCUMENT TRAIL

Documentary evidence used to retrace the provenance of the mummies is the correspondence received by Haast from Giglioli, Price and Theo G Pinches (Department of Egyptian and Assyrian Antiquities, British Museum) held in Alexander Turnbull Library, Wellington (Haast MS Papers 37).

A summary of the pertinent sections of relevant letters follows:

Giglioli to Haast (Folder 66)

22 January 1881 … I cannot promise a human mummy from old Egypt, but shall do my best to try and have one for you …

2 November 1886 (while Haast was in London) … I got your kind letter from Hereford and at once went in search of my Egyptian friend and colleague Prof. Schiapparelli, I only succeeded however in seeing him yesterday evening – He was most kind, says that he is almost sure of procuring for your Museum the two mummies you desire, one plain and the other richer, he says that they can easily be sent direct from Egypt to Christchurch New Zealand and believes that with the package express not more than £30 (the sum you mentioned) will be required. He is writing at once to Boulaq and as soon as an answer comes in about 15 to 20 days you shall hear from me. Thus a good and I feel confident that we will succeed and that thou my dear friend will be happy!

22 November 1886 ... Prof Schiapparelli has just sent me the answer just arrived from the Museum of Boulaq concerning the two mummies you desire, I transcribe. "J'ai pris tous les reseignements au sujet de ce que vous me demander – pour les Momie le Museé porrant vous en envoyée une ordinaire dans le prix 3 ou 4 livres sterlines. Quant a une belle momie, il n'yen a pas pour le moment, mais si vous le desirez ou pourra vous en reserver une de celles que nous recollerons cette année droit à Thebes sort à Akemins."

Schiapperelli says you can have the ordinary one at once, or if you prefer it wait till next spring and get the two together. [Translation "I have appraised all the information on the subject about which you have asked me – for the Mummies, the Museum will be able to send you an ordinary (one) for the price of 3 or 4 pounds sterling. As for a fine mummy, there is not one (available) at the moment, but if you wish it then I will be able to keep for you one of those which we will verify (from) this year's division at Thebes coming from Akmim."] The last sentence refers to the annual division of finds made between the excavator and the then Boulaq Museum by the Egyptian Antiquities Service.

23 November 1886 ... As you will have gathered from the extract in French in my yesterday's letter from the Director of the Boulaq Museum – you are in no way bound to buy them – Schiapparelli and I carefully worded our letter so as to leave you quite free – as it turns up moreover they have no good mummi to dispose of now only a common one of the value of 3 or 4 £ ster which you can buy or leave as you like. So do as you think best, if I were you I would not hesitate in buying the mummy offered to you in London, which if fine is cheap.

4 December 1886 ... I could only answer your kind letter of November 25th today as Prof Schiapparelli has been absent – he tells me the cost of the ordinary mummy cannot be less then £6.10 and he will write today to Boulaq informing them of your wish to secure the mummy they offered for £3 or 4 … Schiapparelli thinks that £24 is dear for a mummy and said that he reckoned he could have got you one for about 16-20£ ster. But of course you have the great advantage of seeing what you buy and that balances quite the difference.

22 January 1887 ... Yesterday Prof. Schiapparelli called on me, he also had been ill with measles – he gave me the enclosed letter which you can see by it that a good plain mummy from Akhmim has been found for you and that you can have it for £5. Packing included. So if you still want it you have to write mentioning Prof. Schiapparelli's name to Mr Emile Brugsch Bey – sending the cheque for the amount to him and giving full directions for sending the case to Christchurch.

Ernesto Schiapparelli (1856-1928) was a notable Italian Egyptologist. He was Director of the Florence Museum, which is presumably where he became acquainted with Giglioli, and later became Director of the Turin Museum for many years (Dawson and Uphill 1972, p. 263). Emile Brugsch (1842-1930) (the suffix 'Bey' is a common Turkish and Egyptian honorific title, equivalent to esquire) was a notable German Egyptologist. He was appointed Assistant Conservator in the Boulaq and Cairo museums in 1881 until retirement in 1914. The correspondence from Giglioli to Haast clearly indicates that Haast had been offered and subsequently purchased a mummy in London for £24 and through the services of Schiappiarelli and Brugsch a plain mummy had been located for £5, including packing, from the Boulaq Museum, Egypt.

A group of 3 letters from F G Hilton Price to Haast (Folder 127) further clarifies the situation:

11 November 1886 ... I was informed by Mr W Budge of the Egyptian Department, British Museum, that a gentleman from the Colonial Exhibition last week was enquiring for a good mummy and that he was told they did not know of one. Unfortunately Mr Budge was not in at the time or he would have informed him that they had in the British Museum a very fair specimen of an Egyptian mummy belonging to me which is for sale and which may be viewed any day. Should the gentleman in question be still desirous of acquiring one I shall be happy to dispose of it …

15 November 1886 ... Many thanks for your letter respecting the mummy. It is a very fair specimen indeed and can be seen at the British Museum if you will ask either for Mr Renouf or Mr Budge to show it to you.

Mr Budge leaves for Egypt on Thursday. The price I want for it is £28 – which I don't think you will say is out of the way when you see it. It is quite true that mummies are to be had cheap at Boulac but then you don't have to advantage of seeing them for selection and then the expense and trouble of getting them home is considerable.

27 November 1887 ... In reply to your letter I beg to inform you that I accept your offer of £24 for the mummy and will have it sent to the Colonial Exhibition during the ensuing week.

This correspondence from Price to Haast confirms that the London mummy referred to by Giglioli was indeed the one in the Price collection and therefore almost certainly the same mummy described in both the *Transactions of the Biblical Society* IX 1893 and the *Guide to the Collections of Canterbury Museum* 1895, 1990 and 1906. Hilton Price also confirms that the price of the mummy was £24.

Two letters from Pinches to Haast confirm that Haast definitely made contact with the Department of Egyptian and Assyrian Antiquities at the British Museum regarding the Price mummy and that he was advised it was good value for money.

Pinches to Haast (Folder 128)

19 November 1886 ... Mr Renouf tells me that he does not think £24 or £25 dear for the mummy offered by Mr Hilton Price. Those which are sold at a cheaper rate are, he says, very inferior. He has had opportunities of seeing several of these last and some are now on sale somewhere in the Old Brompton Road.

22 November 1886 ... Mr Lepage Renouf tells me that he does not consider the mummies to be seen in the Old Brompton Road as being worth buying – he only mentioned them as specimens of the inferior class of articles to be obtained at a low price in Egypt. The owner, moreover, has an exalted idea of their value, having paid something like £100 for them.

The final document relevant to establishing provenance for EA1989.13, A.R.1001.0, is Price's privately printed catalogue of his Egyptian antiquities produced in 1897 with a supplementary volume in 1908.

The 1897 catalogue does not include the mummy, although it does record under No. 1656, "…a set of 11 faience shabtis belonging to Ta-seps-en-Khonsu" which

Figure 1. The mummy, Tash pen Khonsu (EA1989.13), in Canterbury Museum.

Price states was "formerly in my collection but now at the Canterbury Museum, New Zealand," (Price 1897). This establishes beyond doubt the provenance of EA1989.13, A.R.1001.0 as part of the Hilton Price Collection.

There is however an obvious discrepancy in the number of ushabti Price states were associated with the mummy. In the *Transactions of the Society of Biblical Archaeology* IX he states that there were 21 "varying in size from 2 inches (50mm) to 2¼ inches (57mm) in height all quite plain" (Price 1893, p. 243) while in his catalogue he claims the number to have been 11 (Price 1897).

Even adding the seven ushabti present with the mummy when re-catalogued in 1989 to the 11 claimed by Price in 1897, the figure of 21 he claimed in 1893 cannot be reached.

It is perhaps significant that the only major piece of Price's description of the mummy that is omitted from the *Guide to the Collection of Canterbury Museum* is the reference to the ushabti. Therefore is appears likely that Price removed the ushabti before the sale and that the seven with the mummy in 1989 were later substitutes made by Canterbury Museum.

CONCLUSIONS

The Egyptian mummy Tash pen Khonsu, EA1989.13 (Fig. 1), was originally part of the Hilton Price collection and purchased in London for £24 by Sir Julius von Haast for Canterbury Museum in November 1887. The second mummy obtained by Haast, A.R.1002.1 (which was subsequently exchanged with Auckland Institute and Museum in 1957) was almost certainly obtained, with some assistance from Giglioli and Schiapparelli, from Emile Brugsch of the Boulaq Museum in Cairo in 1887 for the sum of £5. The cost of the acquisitions was funded by John Tinline. The only issue of provenance that remains unanswered is establishing how, when and where Hilton Price first obtained the mummy. A search of the archives at the British Museum has not located any relevant references and this information my be lost.

ACKNOWLEDGEMENTS

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FOUR NEW SPECIES OF THE CADDIS GENUS *PHILORHEITHRUS* (TRICHOPTERA: PHILORHEITHRIDAE) FROM NEW ZEALAND

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ABSTRACT

Four new species of caddis belonging to the endemic New Zealand genus *Philorheithrus*: *P. litoralis*, *P. aliciae*, *P. latentis* and *P. harunae*, are named and described.

KEYWORDS

New Zealand; Trichoptera; Philorheithridae; *Philorheithrus*; new species

INTRODUCTION

The Philorheithridae is a small Gondwanan family of about thirty species known from endemic genera in New Zealand, Australia, South America (Chile) and Madagascar. New Zealand has six species in the endemic genus *Philorheithrus* Hare, 1910 (*P. agilis* (Hudson, 1904), *P. lacustris* Tillyard, 1924 and the four described herein). The centre of distribution of the known family members is Australia, where there are fourteen named species in the five genera *Aphilorheithrus* Mosely, 1936; *Austreithrus* Mosely, 1953; *Kosreithrus* Mosely, 1953; *Ramiheithrus* Neboiss, 1974; and *Tasmanthrus* Mosely, 1936. Chile has five species in two genera *Mystacopsyche* Schmid, 1955 and *Psilopsyche* Ulmer, 1907 (data from Morse 2006). The Australian and two New Zealand species are figured by Neboiss (1986) in his *Atlas of the Trichoptera of the SW Pacific – Australian Region*. In addition, studies of Australian Philorheithridae larvae have revealed the probable existence there of two further genera, both currently unnamed, and of larvae tentatively placed into the New Zealand genus *Philorheithrus* (St Clair 1997; Dean et al. 2004). Recently, an unnamed genus containing three species has been discovered in Madagascar (Weaver et al. 2006).

A shared specialised feature of most male Philorheithridae (but not in *Austreithrus*, *Ramiheithrus* or *Psilopsyche*) is the presence of a pair of un-jointed appendages named pilifers (of unknown homology) above the maxillary palpi. Others are a sclerotised lobe at the base of the anal margin in the forewing, a setose nodule on the first segment of the maxillary palpi, and, in several genera, of an extra (fourth) anal vein that has been named "post-anal" (Schmid 1964, p.328). Mosely (1953) does not mention this vein, but Kimmins' (1953) figures 119 and 121 clearly show it for *Philorheithrus agilis* and *P. lacustris*.

Philorheithrus agilis and *P. lacustris*

These two fairly similar species have been confused in some earlier work. Kimmins' (1953) figures 120a-d, supposedly of the male genitalia of *P. agilis*, are clearly those of *P. lacustris*. McFarlane (1966, p. 152) drew attention to this, figured the male genitalia of *P. agilis* from a North Island specimen, and explained the differences between the two species. The inferior appendage upper branch in lateral view has a "dilation to the rear end terminally" in *P. agilis* (he showed this in his figure 38). In *P. lacustris* this dilation is lacking and the upper branch is curved posterad, as shown in Kimmins' (1953) figure 120a (see also Figures 1e and 1f, this paper). There is some variation in the precise shapes, however. Thus Cowley (1978) reported, "Male [*Philorheithrus*] pupae have been collected from several localities in the South Island. Their genitalia range from the *P. agilis* extreme at Totaranui [NN] to the *P. lacustris* extreme at Cass [MC] yet larvae collected from these same localities appeared to be identical". From this result, Cowley concluded that only one species was involved.

We disagree with his conclusion. There are additional characters, such as forewing size and shape, not studied by Cowley, which enable clear separation of the two species. As previously noted by Tillyard (1924), *P. agilis* has a relatively broader forewing than does *P. lacustris*, and the angle between the anterior margin (costa) and outer margin (termen) is greater. For *P. agilis*, forewing length/width (L/W) typically = 2.9-3.3;

angle = 45°-55°; for *P. lacustris*, the values are 3.65-4.2 and 40°-50° respectively (these measurements are defined in Fig. 2). There is a slight sexual dimorphism in the forewing venation; in males of both species, apical fork 4 (M3+4 fork) is absent. It is also nearly always absent in *P. agilis* females, but (in our experience) always present in females of *P. lacustris*. This difference, combined with the relatively narrower wings, makes the *P. lacustris* female forewing venation appear denser than that of *P. agilis*. A further character separating these two species is the presence of thickened, scale-like hairs (androconia) on the hind wing of *P. lacustris*, but not *P. agilis* (Kimmins 1953).

Using these criteria, we have re-examined catches from each known site. The resulting distribution maps for these two species are shown in Figure 3. There are no North Island records of *P. lacustris*. Within the South Island, each species shows a rather patchy distribution, with generally only one present at any one site. However, at MB Hell's Gate, Wairau River Gorge, male and female adults of both species were caught in the same light-trap on two different occasions (Ward and Henderson 1993).

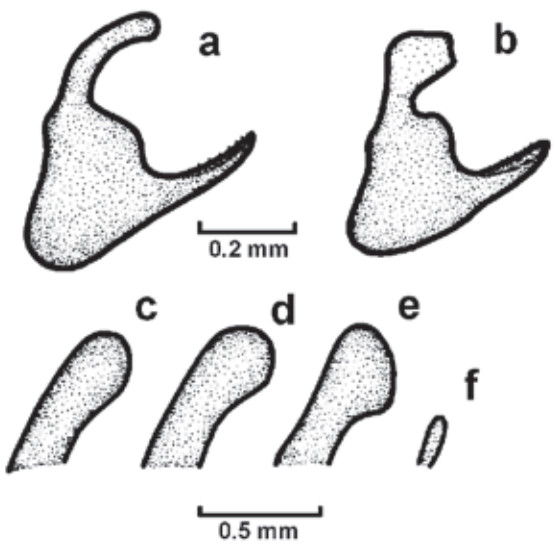

Figure 1. a-f *Philorheithrus* species. **a-b** male genitalia, inferior appendage, lateral of **a** - *P. lacustris*; **b** - *P. agilis*. **c-f** pilifers, lateral of **c** - *P. agilis*; **d** - *P. lacustris*; **e** - *P. litoralis*; **f** - *P. aliciae*.

SPECIMEN REPOSITORIES AND OTHER ABBREVIATIONS

ALEX:	Alexandra Museum, Alexandra, New Zealand;
CMNZ:	Canterbury Museum, Christchurch, New Zealand; GH: GV Hudson Collection, held in Te Papa Museum, Wellington, New Zealand;
IHPC:	Ian M Henderson's personal collection, Massey University, Palmerston North, New Zealand;
NMNH:	National Museum of Natural History, Smithsonian Institution, Washington DC, USA;
NZAC:	New Zealand Arthropod Collection, Landcare Research, Auckland, New Zealand;
OMNZ:	Otago Museum, Dunedin, New Zealand.

Storage medium: alc = 80% SDA (industrial ethanol); pin = dry pinned

Collector's names: GV Hudson = GVH; Ian M Henderson = IMH; Brian H Patrick = BHP; John B and Geraldine M Ward = J&G; John B Ward = JBW.

Two-letter codes for regions in New Zealand (Crosby et al. 1998): BR: Buller, CO: Central Otago, DN: Dunedin, FD: Fiordland, MK: Mackenzie, NC: North Canterbury, NN: Nelson, OL: Otago Lakes, SL: Southland, WD: Westland, WN: Wellington.

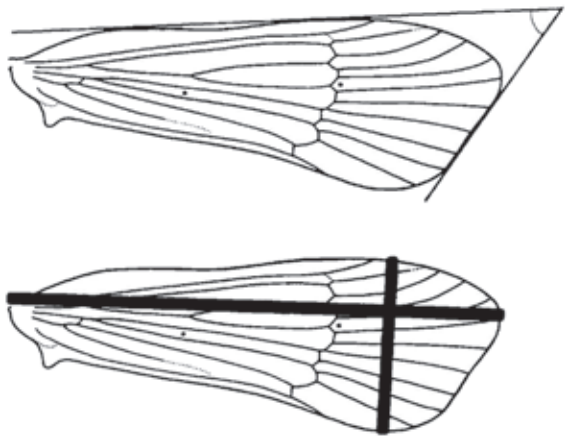

Figure 2. Definition of the wing length/width (L/W) ratio and the angle between costa and termen. W is the maximum width measured perpendicularly to L.

Grid references to collection localities are in terms of the NZMS 260 metric grid, to a precision of 100 m. Altitudes are given in metres (m) above sea level. The notation used to describe the form of the maxillary palpi consists of the relative lengths of the segments followed by the total length. Nomenclature for wing venation follows Mosely (1953).

SYSTEMATIC SECTION

Order TRICHOPTERA Kirby, 1813
Family PHILORHEITHRIDAE Mosely, 1936

Genus *Philorheithrus* Hare, 1910
Type species *Pseudoeconesus agilis* Hudson, 1904 (monobasic)

***Philorheithrus aliciae* sp. nov.**
Figures 4, 5

Derivation of name

This species is named for Alicia Scott in recognition of her support of this research.

Diagnosis

Males are distinct from all other species in the genus by their genitalia and by their small, finger-like pilifers. Both sexes can be identified by the deep hindwing apical fork1 (R2+3 fork), and by the rather broad costal space towards the base of the forewing.

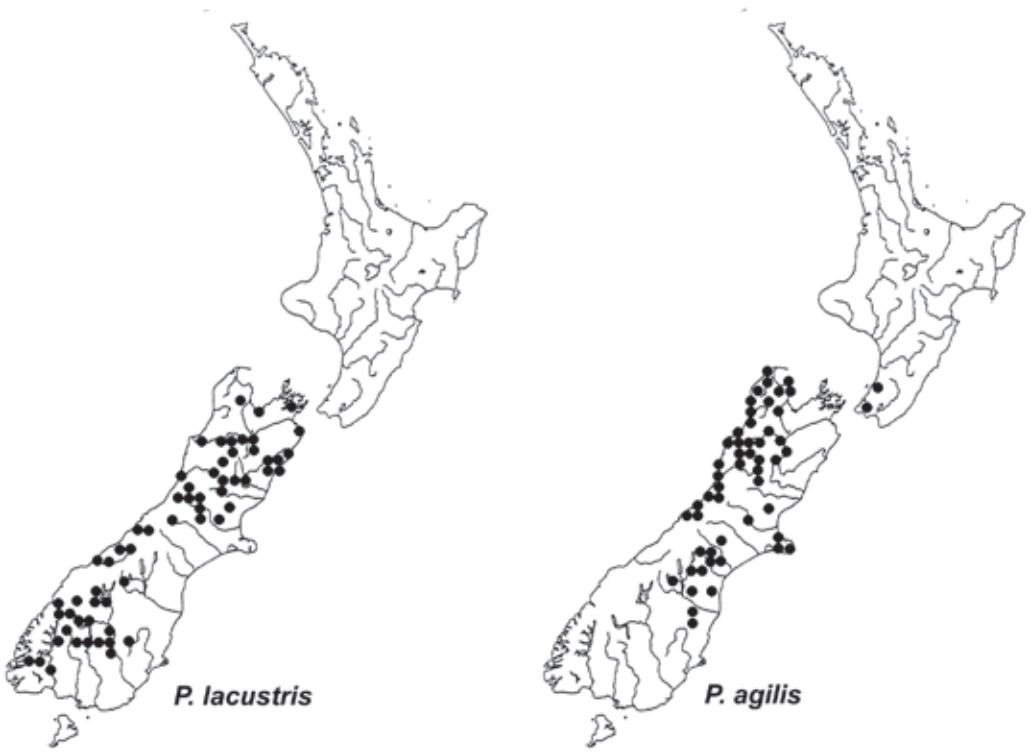

Figure 3. Maps of the known distributions of *Philorheithrus agilis* and *P. lacustris*. Points are rounded to the nearest 20 km.

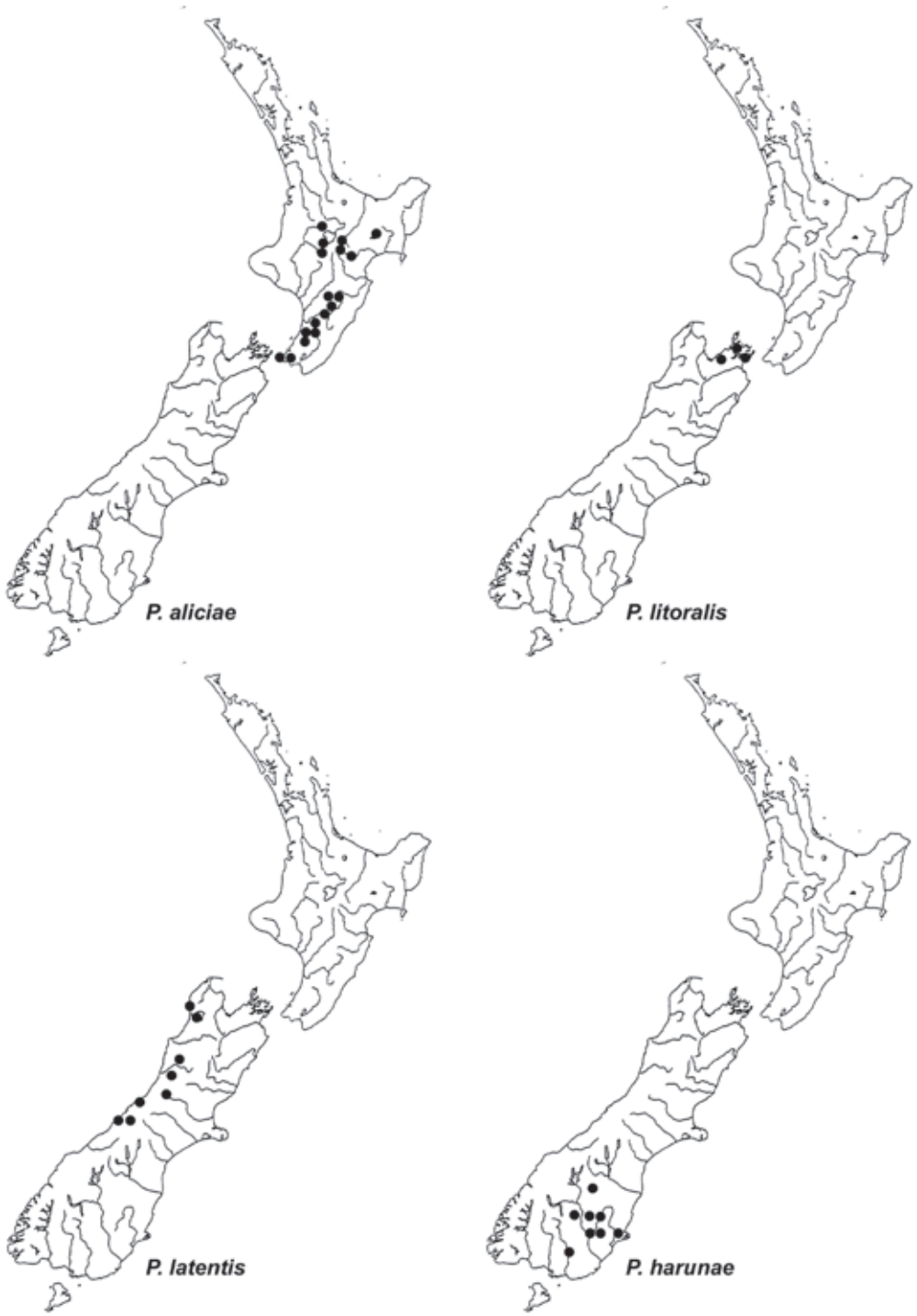

Figure 4. Maps of the known distributions of *Philorheithrus aliciae*, *P. litoralis*, *P. latentis* and *P. harunae*. Points are rounded to the nearest 20 km.

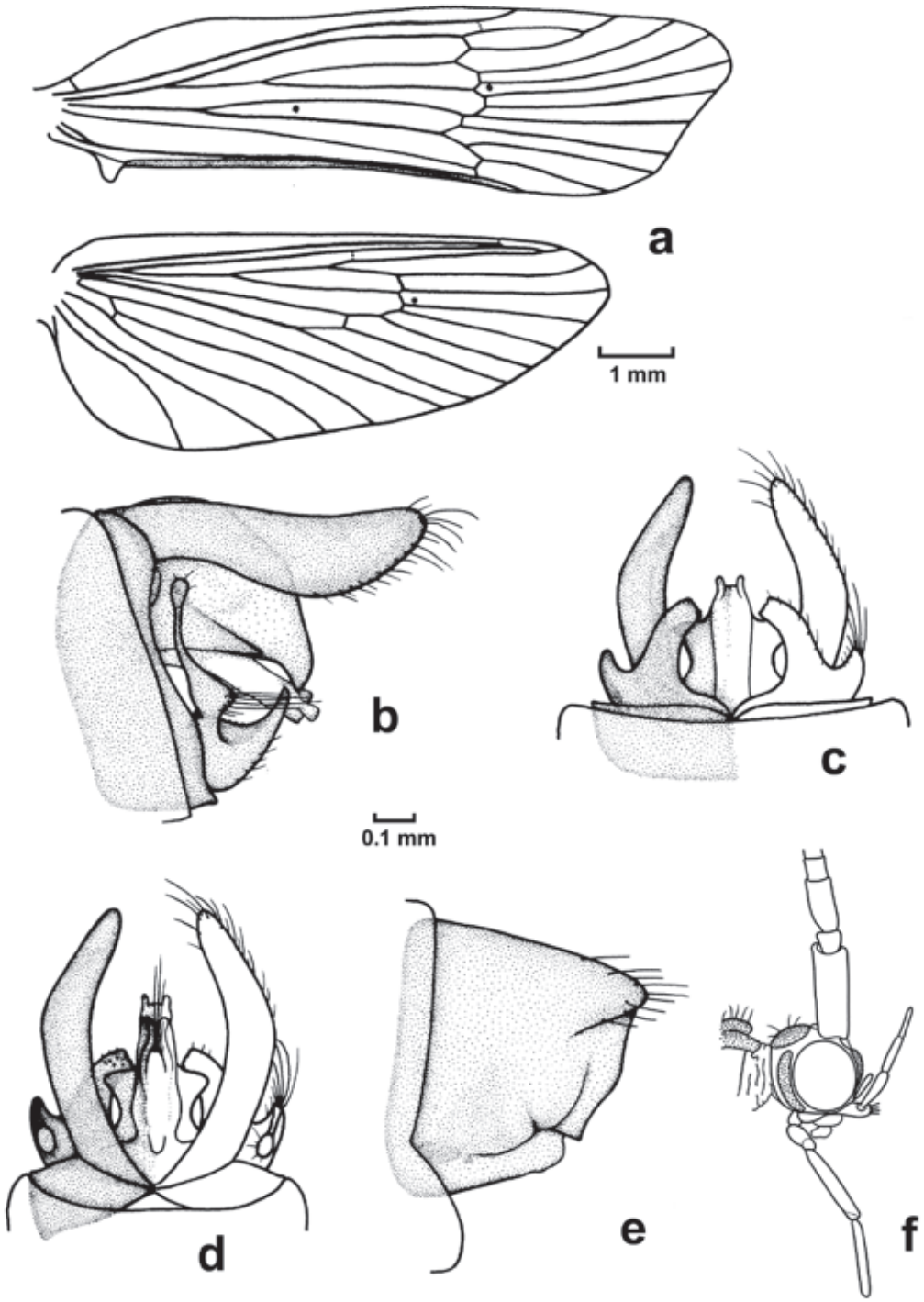

Figure 5. *Philorheithrus aliciae* sp. nov.: **a** - male wings; **b** – male genitalia lateral; **c** – same, ventral; **d** – same, dorsal; **e** - female genitalia lateral, **f** – male head lateral.

Description

Male: maxillary palpi, 4-segmented, 2:3:3:4, 1.1 to 1.3 mm. Pilifers very small, finger-like.

Venation: in the anterior wing only two anal veins are present, which coalesce very early (proximal to the anal lobe). In the posterior wing R1 and R2 join near wing margin, and the base of apical fork 1 (R2+3 fork) overlaps the radial cell by one-third to one-half the length of the cell. Anterior wing length: 9.3- 10.6 mm.

Genitalia: segment X apex recurved, directed ventrad, a pair of triangular flaps oriented horizontally arising from the ventral margin. Superior appendages with concave dorsal margin. Inferior appendage upper branch long, erect, a triangular expanded process near the base, slight curve posterior, apex dilated. A small pointed process to sternite VI (not present in other species of *Philorheithrus*).

Female: maxillary palpi, 5-segmented, 2:5:4:4:3, 2.5 mm.

Venation: apical fork 4 with foot stalk present in anterior wing. Posterior wing, three anal veins present, apical fork 1 overlaps radial cell as in male. Anterior wing length: 11.7- 12.3 mm.

Genitalia: dorsal processes short and rounded, no lateral processes or concavities. A small pointed process to sternite VI.

Remarks

The habitat at the type locality is a small seepage, which has since dried during a drought. This population is presumed extinct, because a thorough search of the locality has not yielded any larvae or further adults.

Type material

Holotype male (CMNZ, alc), WN Wilton Bush, Wellington, 26570 59919, 100 m, IMH, 7 Nov 1979. Paratypes 2 males, 2 females, 2 larvae (IHPC, alc), WN Kahuterawa Stream tributary, 27305 60778, 260 m, IMH, 24 February 1993. Paratypes 1 male, 1 female(CMNZ, alc), TO Kakaho stream, Pureora State Forest 27496 62889, 480 m, IMH,14 Feb 1983. Paratype male (GH, pin, GV Hudson label 88b), WN Campbells Stream, Karori, Wellington, GVH, 16 November 1913. Paratype male (GH, pin, GV Hudson label 88c), WN Karori, Bush Hill, GVH, 9 November 1920. Paratype male (NMNH, pin), TO Mangatawai Stream, 20 km south of Turangi, 27490 62440, 810 m, OS Flint Jr, 3 January 2004. Paratypes 2 male, 1 female (NZAC, alc), RI Moorcock Stream, tributary, 27801 61358, 600 m, IMH, 28 December 1996. Paratype female (CMNZ, pin), HB Ngaheranui Stream, Kaweka Range, 28045 62069, 940 m, BH and H Patrick, 5 January 1995. Paratype female (GH, pin, GVH label 88a), WN Wainuiomata, GVH, Christmas 1906. Paratype female (CMNZ, pin), TK Ohangai, A Castle, 18 December 1927.

Other material studied

Females (IHPC, alc), TO Boyd Hut, Kaimanawa, 27839 62229, 1040 m, IMH, 17 January 1982. Males, females (IHPC, alc) TO Kakaho Stream, Pureora 27468 62896, 480 m, IMH, 14 February 1983. One larva (IHPC, alc) WN Karori Reservoir, upper dam, 26558 59883, 200 m, JBW, 26 November 1994. Larvae (IHPC, alc), RI Limestone Creek near Sixtus Lodge, 27668 61324, 560 m, IMH, 29 January 2000. Females (IHPC, alc), HB Makahu Hut, Kaweka, 28039 62075, 980 m, IMH, 19 February 1981. Larvae (IHPC, alc), GB Mangapuwerawera middle 28723 62663, 760 m, IMH, 21 February 1981. Larvae (IHPC, alc), GB Mangapuwerawera top 28723 62670, 880 m, IMH, 9 February 1979. Two larvae (IHPC, alc), WN Manawatu Gorge Track, 27465 60951, 280 m, IMH, 15 February 1995. One female (IHPC, alc), WN Ngamaia Stream, 27242 60567, 400 m, IMH, 16 February 2001. Larvae (IHPC, alc), WN Ohau River, 27116 60556, 180 m, IMH, 8 April 1981. Larvae (IHPC, alc), WN Penn Creek, 27024 60317, 240 m, IMH, 14 March 1981. Larvae (IHPC, alc), RI Tamaki River, 27681 61163, 400 m, IMH, 23 February 1981. One larva (CMNZ, alc), TO Te Arero Stream, Clements Mill Road, 27893 62448, 740 m, W Crawford 3 August 2000. Two males (NIWA, alc), TO Tongariro River, Pillars of Hercules, 27536 62246, 640 m, K Collier and BJ Smith, 15 November 1994.

Philorheithrus litoralis sp. nov.

Figures 4, 6, 7

Derivation of name

From the Latin *litoralis* (adj), meaning of the shore, alluding to its distribution along the northern coastline of the South Island.

Diagnosis

Forewings are shaped rather like those of *P. lacustris*, but shorter and relatively narrower. Male maxillary palpi are four-jointed (not five).

Description

Male (Fig. 6): maxillary palpi, 4-segmented, 2:4:4:5, 1.9 mm. Pilifers large and asymmetrically clubbed (Fig. 1i).

Venation: anterior wing: apical forks 1, 2, 3 and 5 present and sessile, R1 joins R2 near wing margin. Posterior wing apical forks 1,2 and 5 present and sessile, Sc and R1 join near wing margin. Anterior wing length: 10.5 - 11 .5 mm.

Genitalia: segment IX reduced dorsally, segment X bulbous dorsally with a small setose protuberance dorso-posteriorly, bifid distal to this process and descending. Aedeagus generally lies between the lower arms of segment X. Inferior appendages two branched, lower branch strong, hooked upwards, inner margin with small protuberances, roughly triangular and apex rounded in ventral view. Upper branch weak, evenly curved posteriorly, posterior margin between these two processes slightly convex. Superior appendages dorsal margin straight, apex curving inwards slightly.

Female (Fig. 7): maxillary palpi, 5-segmented, 2:4:4:4:3, 2.6 mm.

Venation: as for male with the addition of apical fork 4 in the anterior wing (with footstalk about half the length of the fork), and in the posterior wing a cross-vein between R1 and R2 near confluence with Sc. Anterior wing length: 12.5 – 14.0 mm.

Genitalia: dorsal processes large and rounded, dorso-lateral area concave. Small but distinct lateral processes at the lower margin of the circular concavity on the lateral aspect of segment IX.

Larvae: Cowley (1978) has described the family characteristics of larval Philorheithridae, and described and figured the larva of *Philorheithrus agilis*. Cowley's descriptions could apply to the present species. The colouration of the head and thorax is light yellow-brown dorsally and laterally, dark brown ventrally.

Pupae: similar to that described for *P. agilis* by Cowley (1976). Dorsal and ventral fringe of hairs on mid tarsi very poorly developed, dorsal fringe consisting of 5-10 widely spaced very weak hairs. Number of mandibular teeth 15.

Remarks

In addition to the characters noted in the main text, *P. litoralis* differs from the two published species in a number of minor characters noted here. The terminal palpomere is relatively longer in *P. litoralis* suggesting that the reduction in number is due to fusion of segments 4 and 5. Maxillary palpi of *P. agilis* 1:3:2:2:2, 2.6 mm; *P. lacustris* 2:4:4:4:3, 2.2 mm; *P. litoralis* is a little smaller: anterior wing lengths of *P. agilis* male 11.0- 12.8 mm; female 13.8-14.8 mm, and *P. lacustris* male 12.0-13.0 mm; female 14.0-15.5 mm.

Cowley's description of the colour of the *P. agilis* larva as "medium to dark brown, occasionally much paler", suggests that he may have collected more than one species. In our material only a few larvae are positively associated with adults via pupae, but it appears that *P. agilis* has dark brown bands along the ecdysal line and frontoclypeal sutures, with the lateral and central areas of the clypeus light brown. *P. lacustris* is almost uniformly dark brown, but with lighter brown patches in the centre of the clypeus and around the eyes. We can distinguish no other morphological differences between the larvae of these three species.

Larval habitat: the type locality is a small spring-fed stream ranging in altitude from sea level to 50 m. The stream is intermittent during summer. Other localities for this species are similar small streams or seepages. The larval habitat of *P. agilis* is large, swift mountain rivers, that of *P. lacustris* appears to be slower streams, but not in seepages.

Pupae are found in aggregations of up to 50 individuals under large stones. Tarsal hair fringes poorly developed in comparison to *P. agilis* in which there is a continuous dorsal fringe of 30-40 hairs. The mandibular teeth are fewer in number, cf. 25 in *P. agilis*.

Type material

Holotype male, paratype female (CMNZ, alc), SD Te Rua Bay, Tory Channel, 26164 59950, 10 m, 21 Oct 1979, IMH. Paratypes 2 male, 1 female, 20+ larvae(NZAC, alc), type locality, 17 Nov 1979, IMH. Paratype pupae (2 male, 1 female) (IHPC, alc), type locality, 16 Dec 1978, IMH. Three paratype males (CMNZ, alc), SD Maud Is, Pelorus Sound, 25850 60199, 30 m, 3-6 Dec 1979, GW Gibbs. One paratype male (NZAC, pin), NN Dun Mountain, 3000 ft, APH, 8 January 1922. Paratypes 5 males, 2 females (CMNZ, alc, 1 male pin), NN Coads Creek, 25387 59846, 800 m, 18 December 1996, RP Macfarlane. One paratype male, 2 paratype females (CMNZ, alc, slides 467, 468), NN Roding River tributary, 25387 59853, 710 m, 18 December 1996, RP Macfarlane.

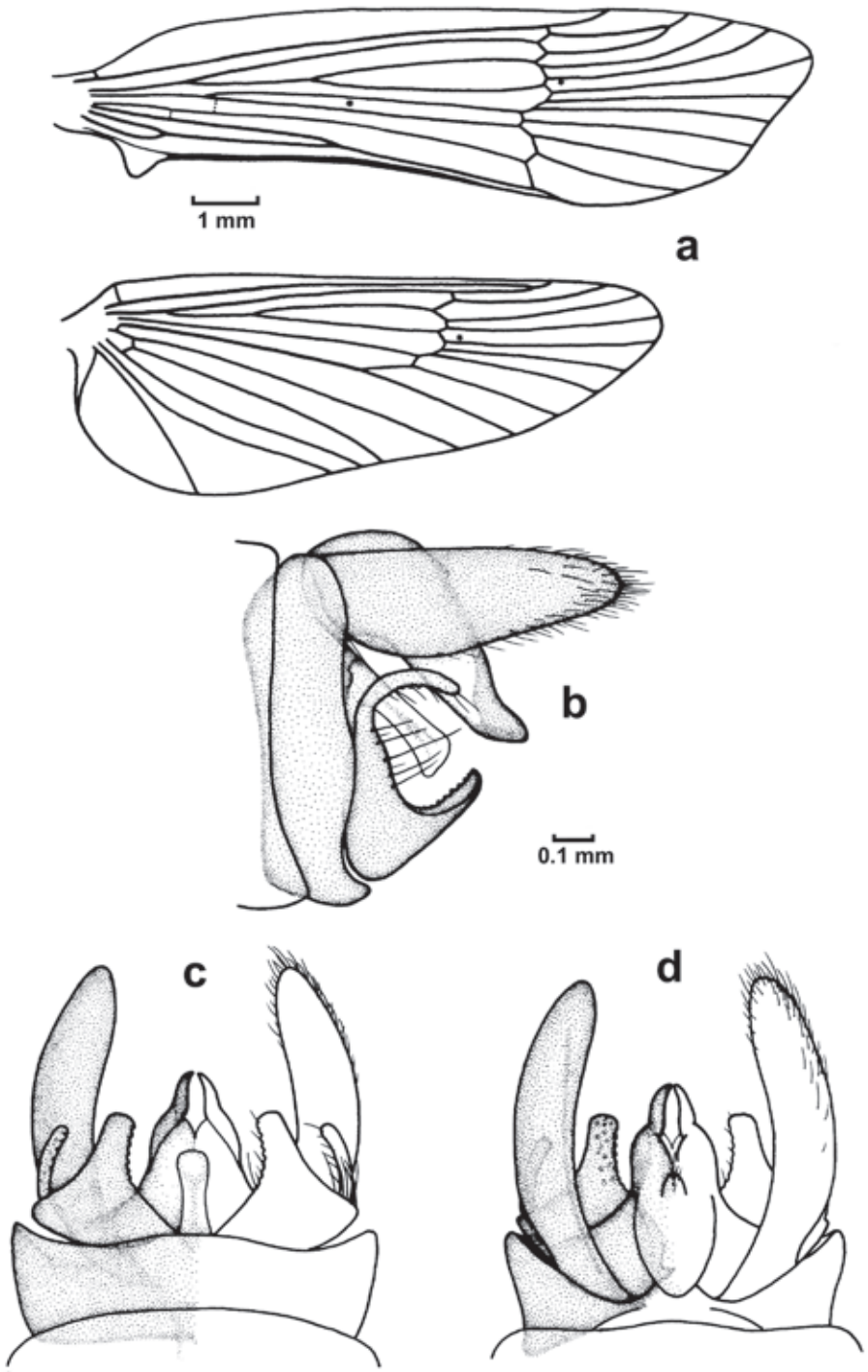

Figure 6. *Philorheithrus litoralis* sp. nov., Te Rua Bay paratype male: **a** - wings; **b** - genitalia lateral; **c** – same, ventral; **d** – same, dorsal.

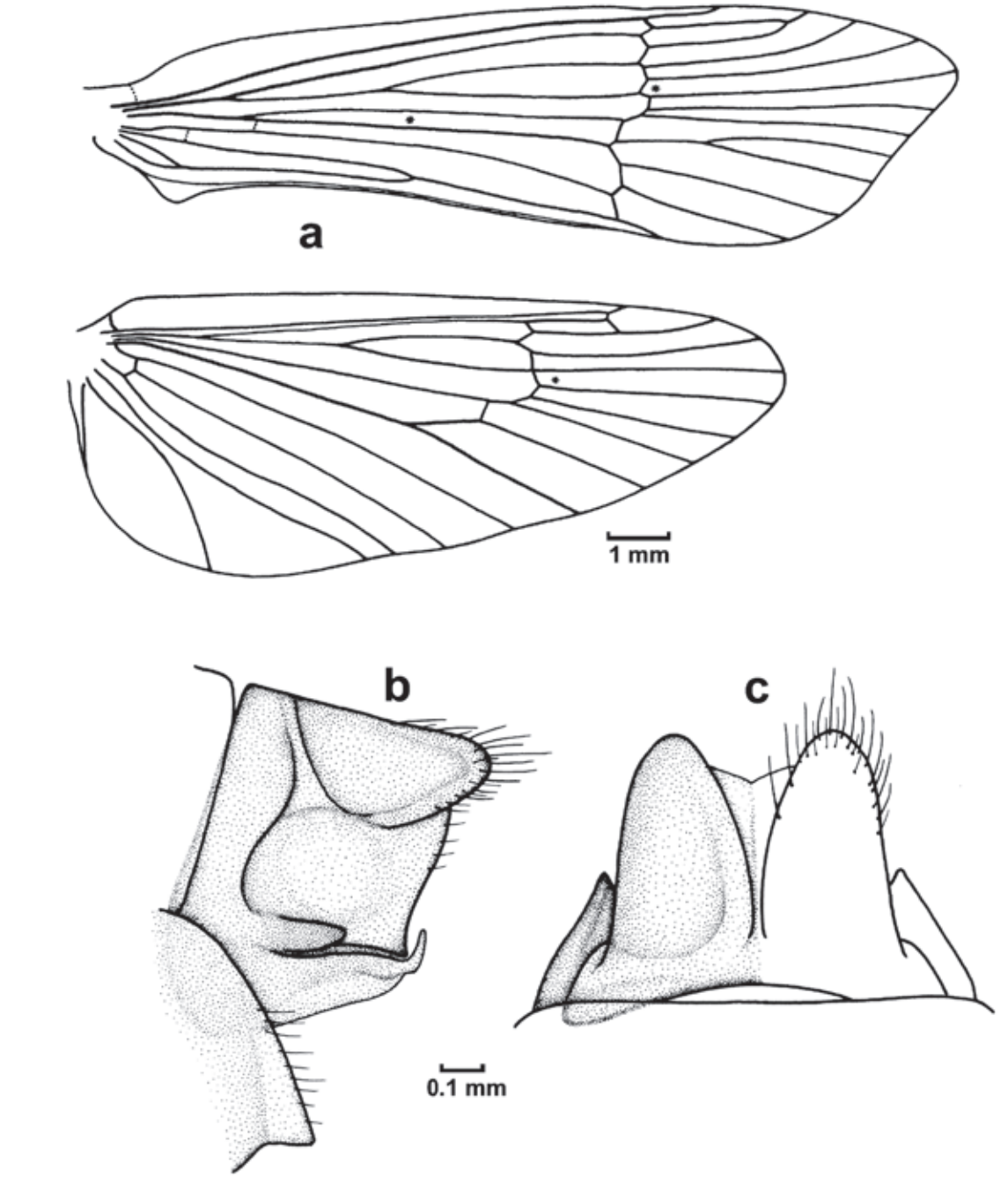

Figure 7. *Philorheithrus litoralis* sp. nov., Te Rua Bay paratype female: **a** – wings; **b** - genitalia lateral; **c** – same, dorsal.

Other material examined

Larvae, pupae (IHPC, alc), SD Te Rua Bay, Tory Channel, 26164 59952, 10 m, IMH, 21 October 1979. Males, females, larvae, pupae (IHPC, alc), MB Wakamarina River tributary at road end, 25594 59813, 80 m, IMH, 13 February 1993.

***Philorheithrus latentis* sp. nov.**

Figures 4, 8, 9, 10

Derivation of name

From the Latin *latens* (adj), meaning hidden or secret, alluding to its unexpected presence in smaller, stony, forested streams.

Diagnosis

Small species with rather blunt forewings. Male maxillary palpi three-segmented, the third segment long and densely clothed with androconia (Fig. 9).

Description

Male: Maxillary palpi 3-segmented, 1:1:3-4, 1.3-1.5. Terminal segment thicker than the others, densely clothed with androconia and apparently extensible. Pilifers very large and convex, covering most of the face. Behind the pilifers is a median finger-like process, upturned at the tip.

Venation: Forewing A1 fused basally with Cu, R1 terminates at, or just before, wing margin, apical fork 4 absent. Wing tip blunt, apical angle 54. Length 8.4 - 8.6 mm. Hind wing radial cell short, equal to or shorter than it footstalk (Rs).

Genitalia: Inferior appendage lower branch thin, obliquely truncate in ventral view. Upper branch vertical, slightly sinuous. Segment X with a small acute projection ventrally.

Type material

Holotype male (CMNZ, pin), WD Franz Josef, Tatare Track, first stream, 22821 57539, 260 m, J&G, 10 December 1999. Two paratype males (CMNZ and ALEX, alc) WD Acrobat Creek and tributaries, 22720 57573, 350 m, JBW, 18 January 1996.

1 paratype male (IHPC, alc), BR Arnold River tributary, Lake Brunner, 23842 58471, 90 m, IMH, 13 November 2002. One paratype male (CMNZ, alc), BR Devils Creek, 24170 58935, 290 m, B Cowie, 24 January 1978. One paratype female (IHPC, alc), WD Franz Josef Glacier, NE side, 22808 57490, 230 m, GW Gibbs, [date

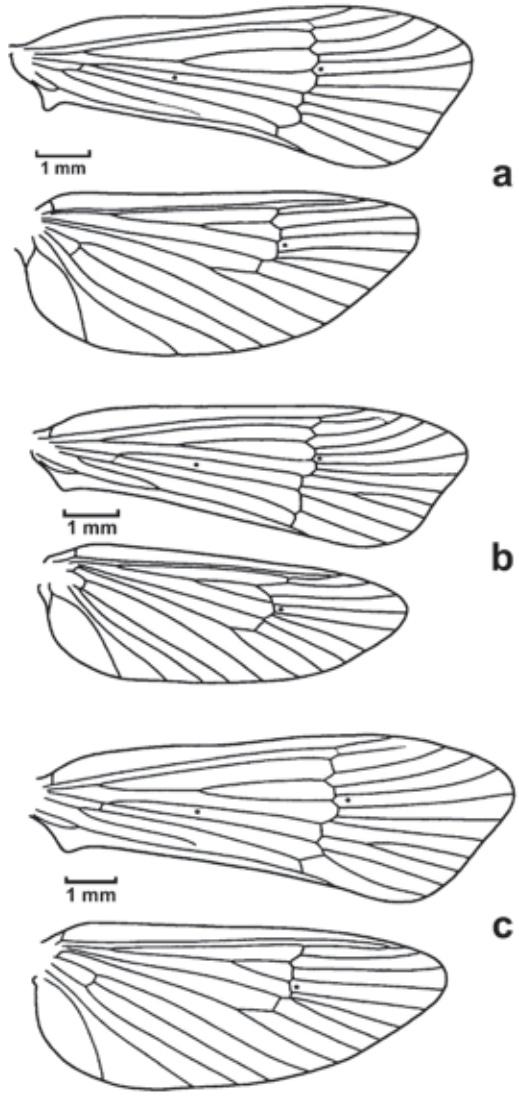

Figure 8. *Philorheithrus latensis* sp. nov. wing venation: **a** - male, Acrobat Creek; **b** - female, Karamea River tributary; **c** - female, Franz Josef.

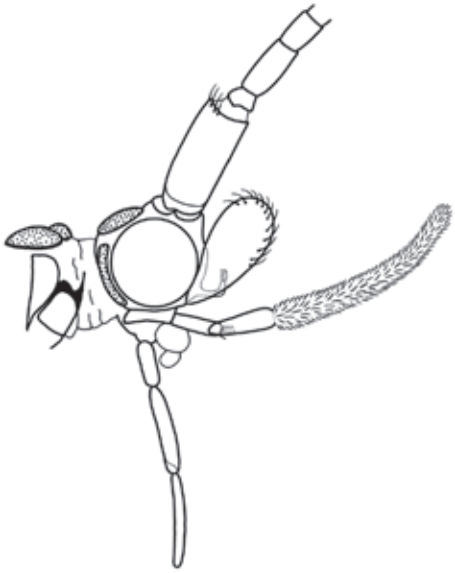

Figure 9. *Philorheithrus latensis* sp. nov. Acrobat Creek male: head, lateral.

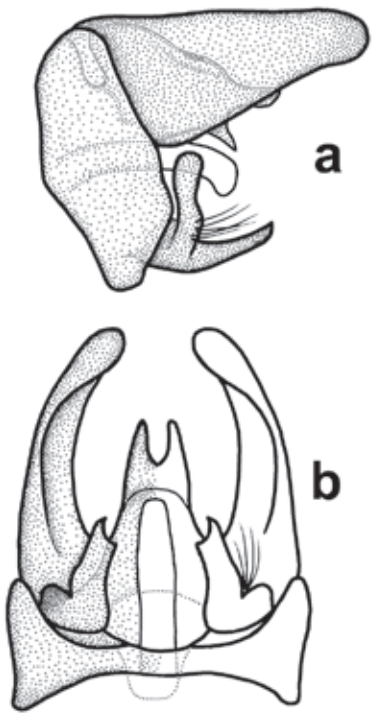

Figure 10. *Philorheithrus latensis* sp. nov. Acrobat Creek male: genitalia; **a** - lateral, **b** - ventral.

Figure 11. *Philorheithrus harunae* sp. nov. holotype male: habitus.

not given]. Two paratype males (CMNZ and NZAC, alc), 1 paratype male (OMNZ, pin), WD Harihari, ridge to south, seepage 23113 57810, 160 m, J&G, 7 December 1999. One paratype female (CMNZ, alc), NN Karamea River, small tributary 24447 59945, 30 m, JBW, 10 January 1991. One paratype female (CMNZ, alc), NN Kohaihai Bluff, small streams, 24347 60115, 100 m, JBW, 5 January 1991. One paratype female (CMNZ, alc), WD Lake Kaniere, Dorothy Creek Falls, 23603 58167, 155 m, J&G, 4 December 1999. One paratype male (CMNZ, alc), BR Murray CreekTrack, first tributary, 24183 58967, 290 m, J&G, 3 January 2001.

***Philorheithrus harunae* sp. nov.**
Figures 4, 11

Derivation of name

Named for Haruna Murayama, in appreciation of her keen interest in the New Zealand flora and fauna, her encouragement of Brian and Hamish Patrick in their collecting and her active involvement in numerous invertebrate surveys.

Diagnosis

A short-winged species of upland DN and CO, extending into SL. Male genitalia similar to that of *P. lacustris*, but distinct on wing venation with apical fork 4 absent from forewings and hindwings in both sexes.

Description

Forewing sub-oval; length, males: 7.4-7.6 mm, females 7.2-7.4 mm. Male and female forewing venation similar: apical forks 1, 2, 3, 5 present, 4 absent. Hindwing apical forks 1, 2, 5 present in both sexes. Forewing: post-anal

vein present in both sexes, very faint, running close to hind margin. Male inferior appendage upper branch very small and weak but highly variable in shape.

Type material

Male holotype (CMNZ, pin), 14 male, 3 female paratypes (CMNZ, NZAC and ALEX, alc), CO Rock & Pillar Range, McPhees Rock, 22753 55222, 1250 m, BHP, 6 February 1991. Two male, 2 female paratypes (OMNZ, pin), 7 male, 1 female paratypes (CMNZ, alc), CO Rock & Pillar Range, McPhees Rock, 22753 55222, 1250 m, BHP, 26 February 1993. One female paratype (CMNZ, alc), DN Black Rock Stream, 22743 54886, 450 m, E Edwards, 17 February 1993. Twenty male, 2 female paratypes, including pair in copula, 10 larval cases, (CMNZ, alc), 2 male, 2 female paratypes(OMNZ, pin), 5 male, 2 female paratypes (ALEX, alc), CO Lammermoor Range, 22588 54993, 1100 m, BHP, 11 January 1991. Nine male paratypes (CMNZ, alc), CO Styx Creek, 22776 55254, 1060 m, E Edwards, 29 January 1993. One female paratype (CMNZ, alc), SL Whisky Creek, Croydon Bush Scenic Reserve, 21882 54522, 220 m, J&G, 23 January 2000. One female paratype (OMNZ, pin), CO South Rough Ridge, 22569 55322 1050 m, BHP, 28 February 1993.

Other material studied

Three larvae (CMNZ, alc), CO North Dunstan Mountains, Lauder Creek, 22462 55920, 1375 m, BHP, 9 December 1993. Larvae, pupae, (CMNZ, alc), CO North Dunstan Mountains, Donald Stuart Creek, 22463 55854, 1300 m, BHP, 7 December 1993. Two larvae (CMNZ, alc), CO Old Man Range, Fraser River Tributary, 1550 and 1410 m, 22117 55327, 1410 m, SJ Morris, 27 January 1997. Two larvae (CMNZ, alc), same, but 18 November 1997. One male, 2 pupae, (CMNZ, alc), DN Pay Office Creek, creek to east, Taieri River Gorge, 23014 54959, 100 m, BHP, 26 October 1993. Three larvae (CMNZ, alc), CO Rock & Pillar Range, upper Styx Creek, 22782 55228, 1225 m, AD Huryn, 29 January 1993. One pupa (CMNZ, alc), CO Rock & Pillar Range, Stonehenge, 22780 55224, 1100 m, BHP, 1 December 1993. One female, 1 larva, 2 pupae, (CMNZ, alc), CO South Rough Ridge, 22569 55322 1050 m, BHP, 28 February 1993.

Habitat and behaviour

Brian H Patrick (Alexandra Museum) provided us with the following account,

> "The flightless caddis *Philorheithrus harunae* is a fast-moving species of swift upland streams in the Taieri catchment of eastern Otago. The long-legged adults hide by day on shaded moss-covered stream sides, being active by night. Typically the species is found in headwater streams of the Lammermoor and Rock and Pillar Ranges above 1100 m within the narrow-leaved snow tussock (*Chionochloa rigida*) zone, but surprisingly a population was found in the upper Taieri Gorge near Hyde at 200m. The species emerges as adults in early to mid-summer at high altitude and can be locally common in streams emerging from the multitude of moss-bogs of these ranges."

Note that *Philorheithrus harunae* is "*Philorheithrus* new species" in Patrick et al. (1993) and in Peat and Patrick(1995, p.105).

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THE CRANE-FLY GENUS *DISCOBOLA* (DIPTERA: TIPULIDAE: LIMONIINAE) IN NEW ZEALAND

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ABSTRACT

The New Zealand fauna of *Discobola* is reviewed. The types of most species have been examined, resulting in a few name changes and synonymy. Neotypes are established to stabilise two of the names in their presently used state. A new species, *Discobola haetara*, is described. A key, a table of characters and figures are used to differentiate the species. Some details of their natural history are given.

KEYWORDS

Crane-fly; *Limonia*; *Discobola*; Tipulidae; New Zealand

INTRODUCTION

The species described and discussed in this paper are treated as members of *Discobola* following the recent catalogue of Oosterbroek (Catalogue of the Craneflies of the World, www.science.uva.nl/ZMA/). Edwards (1923) provided the last review of the New Zealand species of *Discobola*, sometimes placed as a subgenus of *Limonia* (sensu lato). Four known species have been easily recognised and have appeared in various lists under various names. It was not realised that there were several nomenclatural problems. Indeed, the whole gamut of problems that are found in the taxonomy of New Zealand tipulids are present in *Discobola*: inadequate descriptions, synonyms, misidentifications, unrecognised or missing types and new species. This study is based on 625 records comprising 1137 specimens collected mainly by malaise traps set at various sites throughout New Zealand, though there is a preponderance of South Island material. Many, especially badly preserved specimens, recently collected, of the common species (*Discobola dohrni*, *Discobola venustula*) have now been discarded and of the remainder, most specimens have been placed in the collections of Canterbury Museum and their records in its database.

Limonia (sensu lato) once contained well over 2000 species distributed in at least 53 subgenera, At the time it was possibly the largest genus of all animals! The size of this behemoth and the often poor descriptions of the species created problems in interpretations and misunderstandings within the literature. For mere convenience, it would be best to raise all the subgenera to generic status – hoping that this would be a stimulus for closer examination using morphological and genetic techniques on those species which defy unequivocal placement. Some have already been separated at the generic level but 24 subgenera have been transferred to *Dicranomyia*. In New Zealand, there are certainly species that fit *Dicranomyia* (*Idioglochina*) (2), *D.* (*Zelandoglochina*) (17), *D.* (*Nealexandraria*) (1) and *D.* (*Metalimnotes*) (2). But 65 New Zealand species are lumped into the now "blanket" subgenus *D.* (*Dicranomyia*) and among these are representatives of the genera *Limonia*, *Thrypticomyia* and perhaps *Geranomyia*. All these subgenera and genera are shared with Australia or Chile and there are also many species yet to be described. *Discobola* species are immediately recognised by the combination of their extensively maculate or ocellate wing patterns, the presence of the A1 crossvein, and spined or pectinate claws. The New Zealand species are however very disparate in their male terminalia.

SYSTEMATIC DESCRIPTIONS

Order DIPTERA
Family TIPULIDAE
Subfamily LIMONIINAE

Genus *Discobola* Osten Sacken, 1865
Trochobola Osten Sacken 1869. (Unnecessary replacement name for *Discobola*).
Limonia (*Discobola*); Oosterbroek 1989.
Discobola; Oosterbroek Catalogue of the Craneflies of the World, www.science.uva.nl/ZMA/.

Type species: *Limnobia argus* Say, 1824.

Diagnosis (applicable to New Zealand species only). Rostrum moderately elongate, slightly shorter, equal to or slightly longer than scape, lacking a nasus; antennomeres short to long ovoid or sub-cylindrical; cervical sclerite and pronotum elongate; scutellum with or without setae; no postscutellar setae; wings extensively maculate, spotted or ocellate; Sc moderately long, its apex close to level of radius forks; cell A1 with supernumary crossvein at or near apex of A2; claws always with medial to sub-basal spine (*D. giberrina*) and smaller basal ones (sub-pectinate) (other species).

These New Zealand members of the genus can be clearly separated into four species groups.

dohrni group
D. dohrni

venustula group
D. venustula
D. striata striata
D. striata chathamica

tessellata group
D. tessellata

gibberina group
D. gibberina
D. dicycla
D. haetara

***Discobola venustula* (Alexander, 1929)**
Trochobola venusta Osten Sacken, 1894, p. 265 (nec. *Limonia venusta* Bergroth, 1888).
Discobola venusta (Osten Sacken); Edwards 1923, p. 285, fig. 30. Miller 1950, p. 19.
Limonia (*Discobola*) *venustula* Alexander, 1929, p. 248. Oosterbroek 1989, p. 73. Toft and Beggs 1995, p. 40.

Material examined
660 specimens from 283 sites (many duplicated).

Description
Body 9-12 mm; wing 9-13 mm. Colour almost uniform dark brown, head with rostrum, scape and vertex brown, antennomeres pale; thorax (Figs. 1a,b) with narrow pale area on anterior half of prescutal lobes leaving a central dark stripe, four small distinct pale patches on lateral surfaces of mesopleural and sternal sclerites and a larger patch on mesopleuron base, pale spot on lateral surface of mid-coxa; legs pale, femur with distinct, narrow, dark preapical band; tarsi darkening distad; abdomen almost uniform brown; haltere with sub-basal fifth dark, knob somewhat darkened.

Head: vertex with short median lobe. Thorax: notum and scutellum with few long black setae.

Wing (Fig. 2a): maculae sepia to purplish-brown; extensive maculae over apical third of wing; Rs at wing middle, gently curved at base; discal cell almost symmetrical.

Terminalia: male (Fig. 3b), T9 apex slightly emarginate and depressed in centre, the lobes weakly setose; basistyle short, subquadrate, its inner ventral margin with a prominent, separate row of 5-10 strong setae set on distinct bases; mesal ventral lobe narrow, its apex moderately pointed, dististyle sub-cuboid, with short outer subcylindrical lobe that has short setae on its mesal surface, a weak lobe on dorsal apex and a prominent flat, sharply bent rostrum, its tip sharply pointed, two rostral setae at apex; dorsal dististyle reduced to a very small, triangular spinous plate fused at base and weakly splayed from the lateral surface of ventral dististyle, its surface with very fine, triangular, flat scales; paramere lower arm thin straight but apex with short dorsal hook. Female similar to *D. dohrni*.

Remarks
This species is common and widespread in the South Island (Fig. 8) and appears to have little variation. Adults are known from early October to March (early Spring to Autumn).

Key to species of *Discobola*

1 wing pattern sepia to purplish-brown, with many small spots in all cells, especially in basal half of wing.....**2**

wing pattern brown to golden-brown with weak to strong maculae or ocellate patches, lacking fine spots.....**4**

2 discal cell almost symmetrical (South Island).....***venustula***

discal cell distinctly asymmetrical, its anterior border much longer than posterior.....***striata***...**3**

3 stigmal macula distinctly separate (rarely otherwise) from discrete spotting of wing apex (North Island) .....***striata striata***

stigmal macula not differentiated, continuous with dense spotting/ infuscation of wing apex (Chatham Islands).....***striata chathamica***

4 body (>13 mm) brown often with pale, whitish scutellum and patches alongside darker stripe on thorax below wings; wings with darker maculae often obscuring the ocellate markings; vein R_5 somewhat decurved (Fig. 2c).....***dohrni***

body (<13 mm) of strongly contrasting colours (golden-yellow and dark brown); wings with distinct ocellate markings; vein R_5 not decurved.....**5**

5 thorax overall golden brown, median third of postnotum dark; legs dark, with prominent apical and subapical pale rings.....***tessellata***

thorax with strong contrasting markings, the postnotum almost entirely dark; legs pale with prominent dark rings.....**6**

6 wing infilled with contiguous ocellate markings.....***haetara***

wing with prominent pale band across centre, separating the basal and distal ocellate markings.....**7**

7 ocellus at Rs base unattached, discal cell relatively short and only slightly asymmetrical.....***gibberina***

ocellus at Rs base joined with markings within M; discal cell long and distinctly asymmetrical.....***dicycla***

TABLE 1

Part 1: characters of the wing

	wing pattern	Subcosta position	Rs base	discal cell	M_2 length	$M_2 - M_3$ width ratio	R_{3+4} & R_5 apex
dohrni	maculate/ weakly ocellate; dark golden-brown	just before R_{2+3} fork	at midpoint, gently curved	asymmetrical, short	subequal to discal cell	1:1 subequal	strongly bent
tessellata	ocellate, but diffuse, pale golden	well before R_{2+3} fork	at midpoint, gently curved	slightly asymmetrical	subequal to discal cell	1:1.2 - subequal	R3+4 almost straight, R5 gently bent
striata	maculate/spotted; sepia/ purplish-brown	just before R_{2+3} fork	at midpoint, deep, strongly bent	asymmetrical, short	ca 0.3x discal cell	1:1.2 - subequal	almost straight
venustula	maculate/spotted; sepia/ purplish-brown	just before R_{2+3} fork	at midpoint, sharply curved	symmetrical, short	subequal to discal cell	1:1 subequal	gently bent
gibberina	ocellate; golden-brown	just before R_{2+3} fork	gently curved	symmetrical, short	subequal to discal cell	1:1 subequal	gently bent
dicycla	ocellate; golden-brown	just before R_{2+3} fork	before midpoint, sharply curved	strongly asymmetrical, long	ca. 0.4x discal cell	1:2	straight
haetara	ocellate; golden-brown	just beyond R_{2+3} fork	before midpoint, gently curved	strongly asymmetrical, long	ca. 0.4x discal cell	1:2	straight

Part 2: characters of the male terminalia

	T10	ventral dististyle	rostrum	dorsal dististyle	paramere ventral arm
dohrni	almost semicircular, weakly bilobed	normal limonine form	gently curved, with 2 long setae	normal limonine form	thin, finger-like
tessellata	almost semicircular	normal limonine form	gently curved, with 2 long setae	normal limonine form	straight, narrow, triangular
striata	weakly bilobed	squarish, two apical lobes	flat, beak-like, no paired setae	short, straight, fused at base	short, straight, hooked at tip
venustula	almost semicircular	squarish, two apical lobes	flat, beak-like, no paired setae	short, gently curved outwards, fused at base	moderately long, hooked at tip
gibberina	broadly concave	ovoid/ "boxing glove"	bilobed, no paired setae	very short, straight, free	long, very thin, sinuate
dicycla	distinctly bilobed	"boxing glove"	thin, flat, bent "thumb", no paired setae	short, straight, free	short, slightly twisted, simple tip
haetara	almost straight	"boxing glove"	straight, lobe "thumb", no paired setae	very thin, gently curved, free	short, gently curved dorsad, simple tip

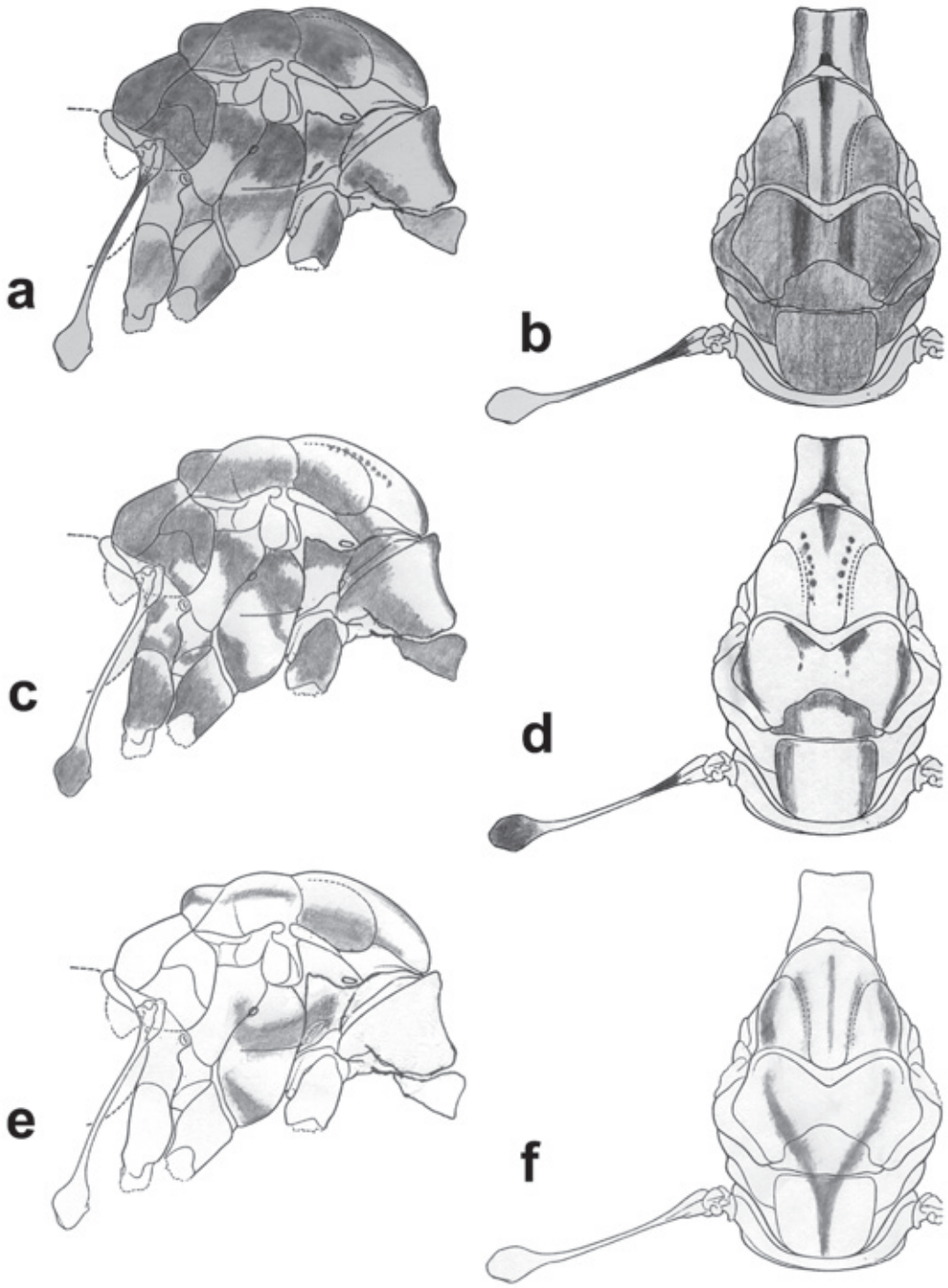

Figure 1. Thorax, in lateral and dorsal views, of **a**, **b** *Discobola venustula*. **c**, **d** *D. striata*. **e**, **f** *D. tessellata*.

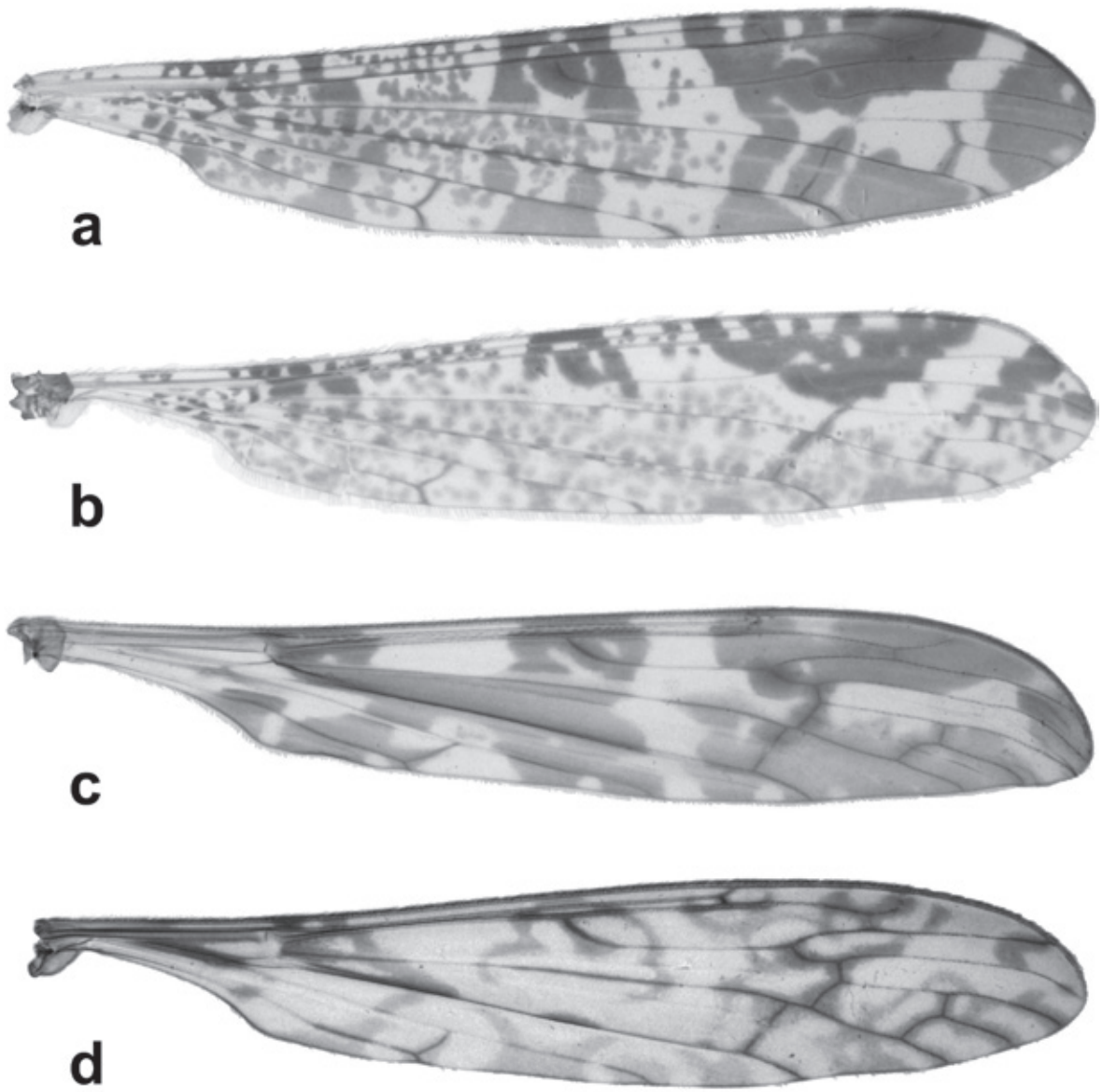

Figure 2. Wings of **a** *Discobola venustula*. **b** *D. striata*. **c** *D. dohrni*. **d** *D. tessellata*.

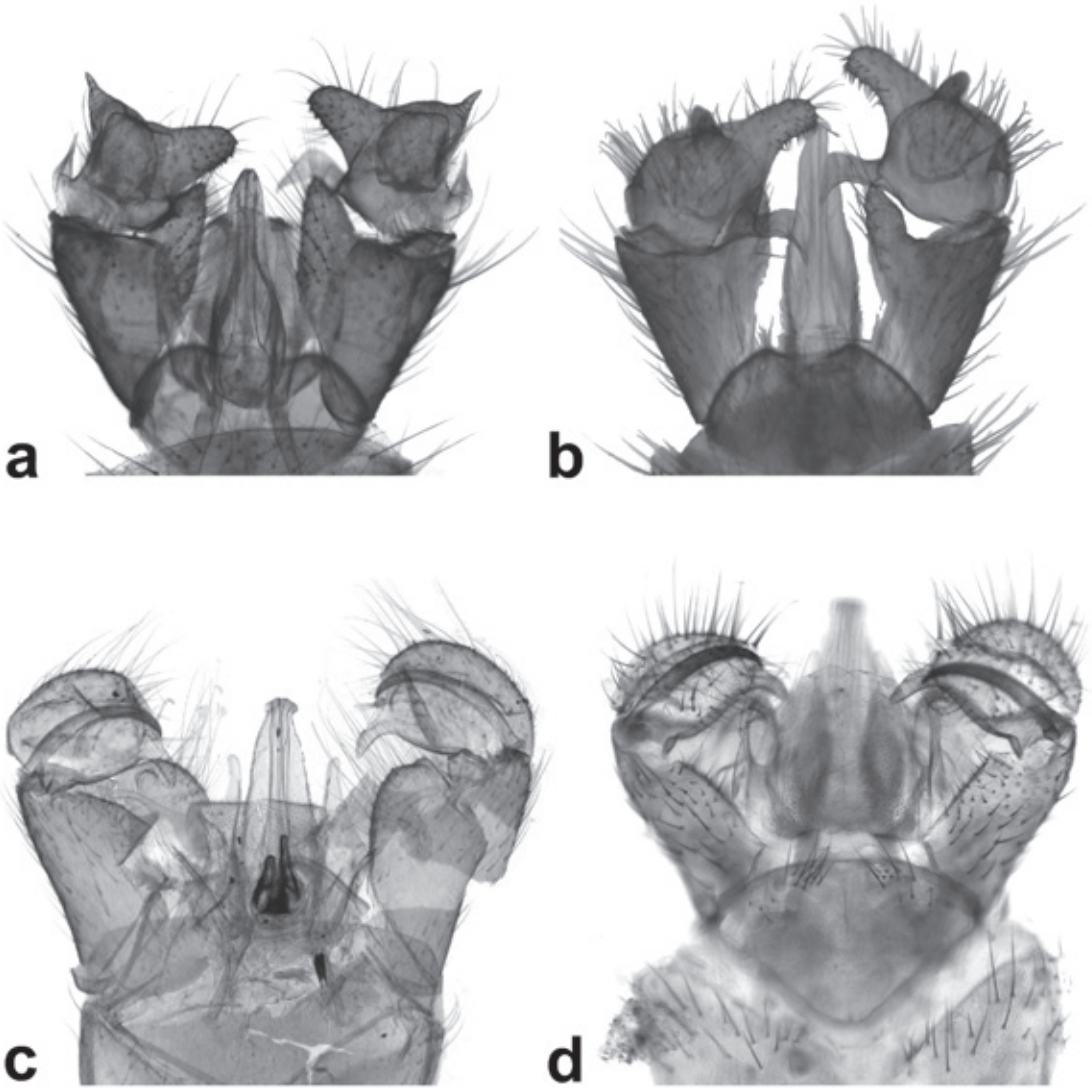

Figure 3. Terminalia of **a** *Discobola striata*. **b** *D. venustula*. **c** *D. dohrni*. **d** *D. tessellata*.

***Discobola striata* (Edwards, 1923)**
For synonymies and remarks refer to each subspecies.

Description

Body 9-12 mm; wing 9-12 mm. Colour: head brown; scape brown, the antennomeres pale brown; pronotum with narrow median stripe; thorax (Figs. 1c,d): prescutum with narrow median and lateral dark brown stripes, sometimes joining to include scutal lobes, scutellum and entire postnotum, the scutellum and postnotum slightly paler on their discs; scutal setae often inserted at dark spot; prominent dark stripe from cervicale, lateral margin of pronotum, and the forecoxae to postnotum; pale immediately below; ventral surfaces dark; haltere with sub-basal fifth dark and knob darkened; legs pale, the femora with subapical dark ring; abdomen and terminalia almost uniformly dark brown.

Head: vertex with sharp lobe immediately above antennal bases.

Wing (Fig. 2b): maculae sepia to purplish-brown; with small macula at Rs fork and wing apex and a larger, arcuate macula centred on stigma, otherwise extensively spotted including apical third of wing; Rs at wing middle; strongly curved at base, attachment perpendicular; R_{4+5} straight then gently curved at apex; discal cell highly asymmetrical, M_2 cell only half the length of M_3.

Terminalia: male (Fig. 3a), T9 apex slightly emarginate and depressed in centre, the lobes weakly setose; basistyle short, subquadrate, its inner ventral margin with a prominent, separate row of 5-10 strong setae set on distinct bases; mesal ventral lobe narrow, its apex moderately pointed, dististyle sub-cuboid, with short outer conical lobe, lobe on dorsal apex short, subconical; a prominent flat, sharply bent rostrum, its tip sharply pointed, two rostral setae at apex; dorsal dististyle reduced to a very small, triangular spinous plate fused at base and closely appressed to lateral surface of ventral dististyle, its surface with very fine, triangular, flat scales; paramere lower arm thin straight but apex with short dorsal hook. Female similar to *D. dohrni*.

Remarks

The type specimens for the names now included under *D. striata* have been examined and those for *T. picta* Hutton, 1900 and *D. chathamica* Alexander, 1924b have been compared directly. As there is now a synonymy involved, Edwards' prior name takes precedence over Alexander's replacement name for the homonymic *Trochobola picta* Hutton, 1900.

***Discobola striata striata* (Edwards, 1923) new status**
Trochobola picta Hutton, 1900, p. 37 (nec. *Limonia picta* de Heer, 1849).
Discobola picta (Hutton); Edwards 1923, p. 285, fig 31. Alexander 1929, p. 181. Miller 1950, p. 18.
Discobola striata Edwards, 1923, p. 285, figs 32, 134. Miller 1950, p. 18. **New synonymy**.
Limonia (*Discobola*) *pictoralis* Alexander, 1929, p. 248. Oosterbroek 1989, p. 73. (new name for *picta* Hutton (nec *Limonia picta* De Heer, 1849)).
Limonia (*Discobola*) *striata* (Edwards); Oosterbroek 1989, p. 73.

Material examined

Holotype male *Trochobola picta* Hutton, 1900, Wellington GV Hudson (CMNZ). Holotype male *Discobola striata* Edwards, 1923, Karori (79c), Wellington GV Hudson (BMNH(E) #246588). One male Ohakune TR Harris 20.x.21 (USNM/2250 det *pictoralis* Alexander). One male Swanson, Auckland WE Long 17.ix.47 stn 10 (USNM/ 2 981 *L. striata* det Alexander). One male York Bay, Wellington JG Myers 1.iii.24 (USNM *L. striata* det Alexander) and 23 specimens from 16 sites.

Description

Wing (Fig. 2b): apex with many translucent areas between spots; stigmal maculation quite separate and distinct.

Remarks

There is some variation in the thoracic pattern in that the dorsal stripe of the pronotum and scutum may extend further backwards as an infuscation incorporating the scutal setae spots and fusing with a more extensive infuscation of the scutellum and postnotum. Variation is also present in the wing markings and the most extreme form is seen in Edwards' holotype, a pattern that is somewhat similar to the Chatham Island form. This variability is not associated in any changes in the form of the male terminalia, which are remarkably constant. Another common species but this form is only in the North Island (Fig. 8). It should be noted that Alexander identified and labelled specimens as *Limonia striata* but did not publish its priority over his own replacement name, *pictoralis*. Those two specimens (noted above) are consistent with the common form of *Trochobola picta* Hutton rather than *Discobola striata* Edwards.

***Discobola striata chathamica* Alexander, 1924 new status**

Discobola chathamica Alexander, 1924b, p. 167. Miller 1950, p. 18.
Limonia (*Discobola*) *chathamica* (Alexander); Oosterbroek 1989, p. 73.

Type locality: Mangere Island, Chatham Islands (CMNZ)

Material examined

Holotype male, paratype male Mangere Island, Chatham Islands 4-21 Jan 1924, C Lindsay (CMNZ); paratype one male Kaiangaroa, Chatham Islands G Archey (USNM/ paratype 2936 det. Alexander), (the third paratype is not in either CMNZ or USNM), and five other specimens from two sites.

Remarks

Most details of this species are close if not identical to the nominate subspecies. Wing apex extensively darkened with many of the spots fused, the stigmal maculation continuing to wing apex. The male terminalia seem identical and this population is recognised separately only by virtue of the slight differences in the wing maculation based on rather poorly preserved specimens, and its isolation on the Chatham Islands.

***Discobola tessellata* (Osten Sacken, 1894)**

Limnobia tesselata White ms. Walker 1848, p. 48 (nomen nudum).
Trochobola tessellata Osten Sacken, 1894, p. 266.
Discobola tesselata (sic) (Osten Sacken); Edwards 1923, p. 286, figs 33, 34. Miller 1950, p. 19.
Trochobola variegata Hutton, 1900, p. 36.
Limonia (*Discobola*) *tessellata* (Osten Sacken); Alexander 1929, p. 181. Alexander 1939, p. 219. Oosterbroek 1989, p. 73. Toft and Beggs 1995, p. 40.

Material examined

Holotype male *Trochobola variegata* Hutton, 1900. (CMNZ).
63 specimens from 43 sites in both islands (some duplicated) (Fig. 8).

Description

Body 9-11 mm; wing 10-14 mm. Colour: head brown; scape and flagellum brown paling behind; thorax (Figs. 1e,f): pronotum pale with weak laterofrontal infuscation which includes the neck sclerite; scutum pale, infuscate laterally, prominent median dark line; median groove pale; scutal lobes with a brown line, this continues onto scutellum and broadens, the lateral and posterior scutellar margins brown, postnotum brown in central quarter to third, these scutal and postnotal marks forming a distinctive Y-shaped macula; thorax sides with brown spot on anatergite and slight infuscation above forecoxa; mid coxa faintly infuscate; trochanters pale; femora dark brown with prominent narrow apical and broad, distinct subapical pale rings; tibiae and tarsi brown the tarsi darkening apicad; abdomen pale, darkening laterad on pleurae; haltere dark for entire length; abdomen golden, very weakly darkened on posterior margins of tergites and adjacent pleurae. Head: vertex with weak median tubercle; antennomeres distinctly (2-3x) longer than broad; ovoid to subcylindrical. Thorax: scutellum with a few setae on each side.

Wing (Fig. 2d): entire costal margin golden, the ocellate pattern golden-brown the ocellar margins sometimes ill-defined or faint; Rs at wing middle, very gently curved; Sc fork well before R2 fork; discal cell asymmetrical, relatively short and broad; cell M_2 longer than cell M_3; m-cu before discal cell base; Ax crossvein very close to wing margin at apex of 2A.

Terminalia: male (Fig. 3d), T9 very weakly bilobed and depressed in centre, each lobe with a few dark setae; basistyle short, the ventral mesal lobe subglobular and with a very short, pointed apex directed dorsad; ventral dististyle globular, rostrum short, with two long, slightly spatulate setae set on small bases on the inner face above base of rostrum; dorsal dististyle gently curved, its outer surface with dense, very fine, triangular, appressed spines; aedeagus slightly constricted subapically the apex bent ventrad and weakly bilobed; parameres relatively short, straight and narrow/triangular. Female similar to *D. dohrni*.

Remarks

This species is clearly similar to the widespread Australian *D. australis* and perhaps the New Zealand *dohrni* group as they share the plesiomorphic form of the male terminalia. The general body and wing patterns are closest to *D. australis*. Present records show that *D. tessellata* is common throughout the forests of the North Island, Nelson and Westland. There is a collection gap between the records from Westland and those of the far south. It is absent from the eastern dry forests of the South Island. Larvae and pupae are unknown.

***Discobola dohrni* (Osten Sacken, 1894)**
Trochobola dohrni Osten Sacken, 1894, p. 264. Hutton 1902, p. 189.
Discobola dohrni (Osten Sacken); Edwards 1923, p. 287, fig. 27. Miller 1950, p. 18.
Limonia (*Discobola*) *dohrni* (Osten Sacken); Oosterbroek 1989, p. 73.
Tipula fumipennis Hudson, 1892, p. 48, pl. 5, figs 2, 2a-b (nec. *Tipula fumipennis* Butler, 1875 = *Limonia* (*Idioglochina*) *fumipennis* (Butler)). **New synonymy**.
Trochobola ampla Hutton, 1900, p.36-37, pl. 3, fig. 10. **New synonymy**.
Trochobola dohrni (Osten Sacken); Hutton 1902, p. 189.
Discobola ampla (Hutton); Edwards 1923, p. 287, fig. 26. Miller 1950, p. 18.
Limonia (*Discobola*) *ampla* (Hutton); Alexander 1929, p. 180. Alexander 1939, p. 219. Oosterbroek 1989, p. 73. Toft and Beggs 1995, p. 40.
Discobola fumipennis (Hudson); Edwards 1923, p. 287. Miller 1950, p. 18.
Limonia (*Discobola*) *milleri* Oosterbroek, 1989, p. 73. (replacement name for *fumipennis* Hudson). **New synonymy**.

Type locality: here restricted to Christchurch (see remarks below).

Material examined
211 specimens from 152 sites (some duplicated).

Description
Body 13-16 mm; wing 13-21 mm. Colour in life golden-brown, with very distinct maculation, whitish scutellum and narrow areas on the thorax below the wing; overall form very hump-backed with high prescutum and elongate pronotum and neck sclerites, which bring the head to below the level of the forecoxae; thorax almost uniform brown; pronotum and central part of scutellum pale; three distinct prescutal stripes, a paler stripe from pronotum to scutellum and darker stripe below from forecoxa to postnotum, this with pale margins; all pale areas are due to fine pale pubescence which is obliterated on alcoholic preservation or fatty exudates; ventral areas and coxae pale; legs long brown, femora with very short pale terminal ring, a broad, dark subterminal ring and equally broad paler band basad which gradually merges into ground colour of basal half; abdomen brown, often paler on anterior tergites, sparsely setose.

Head: slightly ovoid; vertex very narrow, ridged between eyes and with very small tubercle immediately above antennal insertions; vertex ridge continues backwards on occiput, few setae; rostrum long, reaching beyond end of scape; antennomeres ovoid, 2X or less as long as broad.

Wing (Fig. 2c): the aspect ratio (length/width) ratio varies from 4.7 in the smaller winged individuals to 6.2 in the larger, and females tend to have shorter, broader wings than the males; those with a narrower wing aspect ratio have the apical portion of R_5 decurrent (bent towards the posterior; ocellate pattern is often obscured by the fusion of rings and bands; Sc reaching almost to level of r and M forks, Sc_1 and Sc_2 subequal, R curved at r, r short, Rs long, strongly curved at base; discal cell elongate its anterior border subequal to length of M_{1+2}.

Terminalia: male (Fig. 3c), T9 deeply emarginate, narrow central portion unsclerotised and often completely covered by T8 leaving only a small triangular lateral portion visible; T10 flat, bare centrally, its posterolateral edges swollen, raised and slightly produced as two lobes, these lobes with long dark setae; basistyles squat, setose dorsally, almost bare laterally and ventrally, ventral mesal lobe large, subconical with short, subcylindrical, subapical lobe projecting dorsad; long apical setae; ventral dististyle short, its distal lobe small, rostrum short, with two weak, widely separated, slightly spatulate setae on basal unsclerotised portion; parameres bilobed, the lobes widely separated and subparallel; aedeagus short, the lower paramere lobes closely applied to its upper surface, evenly attenuate but slightly constricted before the weakly bilobed hooked apex. Female, T8 short, with moderately long setae on posterior half; T9 very short, with similar setae; T10 setose the setae increasing in length posteriorad, those on the posterior margin almost reaching the apices of cerci; cerci gently curved with almost complete fringe of setae along ventro-lateral margin; subgenital plate moderately setose, the ventral bulge slightly raised; hypovalvae dark brown, almost straight.

Remarks
In describing the species, Osten Sacken designated no holotype and stated that he had five males and one female from Hutton, in Christchurch and Helms in Greymouth, and one specimen from Dohrn that Osten Sacken believed came from the North Island. His description is based almost entirely on the female that came from Hutton. These syntypes have not been seen.

Although Hutton (1902) synonymised his *ampla* under *dohrni*, Edwards (1923) recognised them as separate species on the North and South Islands respectively. The type locality for *dohrni* is hereby restricted to Christchurch where the species is still moderately common in local forest reserves. Local specimens have been used as a basis for the above description. Much confusion has arisen over the status of T*rochobola fumipennis* Hudson and *Trochobola ampla* Hutton. Hutton clearly recognised that *fumipennis* was already occupied (by Butler 1875, though perhaps not by today's stricter rules), by listing Hudson's name and reference above the description and stating, " I have not adopted Mr Hudson's name for this species, because the wings are not smoky, and because we have already in New Zealand a *Limnobia fumipennis* which might cause confusion". He included Butler's species in the same paper (p.35). Hudson gave no description or measurements of his adult male and female and his figure (of the female) leaves much to be desired in the details of venation (a forked 2A instead of a crossvein) and pattern.

There are no specimens labelled as the types of *Tipula fumipennis* Hudson, 1892 in the Hudson Collection, Museum of New Zealand. There are four specimens labelled *Discobola fumipennis* by Hudson but all have collection dates after that of the description (Palma et al. (1989) and recently rechecked (Palma pers. comm.)). Hutton certainly had at least a male and female from Hudson when he described *Trochobola ampla* Hutton, 1900. In the Hutton collection housed in the Canterbury Museum, there is one Hudson specimen from Wellington, the published type locality, but with no date. It fits closely the description and measurements given by Hutton (1900). Hutton (1902) stated that he had (in 1900) unfortunately overlooked *Trochobola dohrni* Osten Sacken (1894) and thus placed his *Trochobola ampla* and *Tipula fumipennis* Hudson as its synonyms. This male is labelled *Trochobola dohrni* det Hutton. This specimen is now selected and labelled NEOTYPE, *Trochobola ampla* Hutton and NEOTYPE, *Tipula fumipennis* Hudson 1892. This formally stabilises Hutton's view, and as a consequence, *Limonia* (*Discobola*) *milleri* Oosterbroek 1989, a replacement name for *Tipula fumipennis* Hudson, becomes a primary synonym of *Discobola ampla*.

Edwards (1923) separated *D. dohrni* and *D. ampla*, without elaborating, on "certain differences, which may be only varietal, but ought not to be disregarded" a view not followed here.

This species is widespread (Fig. 7) and its larvae inhabit the logs and twigs of the forest floor or dead standing timber. Larvae have been taken from at least *Olearia*, *Coprosma*, *Hebe*, *Dracophyllum*, *Fuchsia*, *Metrosideros*, *Podocarpus*, *Dacrydium* and *Nothofagus* species. They are found in wood that is well decomposed and may well be reworking the frass and detritus left by other burrowers (eg cerambycids and Tipulidae: *Leptotarsus* (*Chlorotipula*) species). The adult emerges in the early evening and is seen usually on tree trunks, occasionally hanging by its fore and mid legs while becoming fully sclerotised. It has been seen flying only at night, and is shy of light. It may be taken by sweeping forest vegetation during the day. It has been collected in all months of the year.

***Discobola gibberina* (Alexander, 1948)**
Discobola gibbera Edwards, 1923, p. 286, fig. 29. Alexander 1924a, p. 645, fig. 4. Miller 1950, p. 18.
Limonia (*Discobola*) *gibbera* (Edwards); Alexander 1929, p. 181. Alexander 1939, p. 219.
Limonia (*Discobola*) *gibberina* Alexander, 1948, p. 140 (nec. *Limonia gibbera* Alexander, 1916). Oosterbroek 1989, p. 73.

Material examined

Holotype female body, one wing, one leg pinned, red label circle HT, *Discobola gibbera* Edwards, det 1921 Tisbury, 31.10.15. The specimen is in poor condition on a rusty pin (BMNH), also one wing, one leg on slide #2053, box 28, position 18, Alexander Collection (USNM). One male Governors Bay, Christchurch. JF Tapley 30.x.22 (USNM/2053)One female Henderson, Auckland DM King 19.viii.49 (USNM), and 74 specimens from 54 sites.

Description

Body 8-10 mm; wing 9-12 mm. Colour: head black; palps and antennae only slightly paler, the 2nd antennomere strongly contrasting pale yellow-brown; thorax (Figs. 4a,b): prescutum with broad, triangular, dark median stripe, this paler and diffuse anteriorad; posterior portions of scutal lobes, scutellum and postnotum dark brownish-black; broad black band over posterior pronotum to haltere base and down over anepisternite to ventral surface of sternopleuron leaving only a narrow triangular pale patch along margin of notum to wing base, across the pleural suture, on the posterior ventral corner of sternopleuron and above hind

coxa; anterior coxa and anterior face of mid-coxa dark; legs pale, with prominent short, apical black rings on femoral apex, weaker on tibia and apex of 2nd tarsomere; tarsomeres 3-5 black. Abdomen with broad transverse dark bands on each tergite, weaker in centre and on sternites.

Head: vertex without lobe above antennomeres and ridge between eyes very weak. Thorax: notal setae, long, black; no scutellar setae.

Wing (Fig. 5a): distinctly yellow brown, darkened at very base; broad dark area over humeral vein and bases of R, M and Cu, with another broad band immediately beyond; prominent isolated ocellus centred on Rs fork, others on crossveins and apices of R and M branches, 1A apex and anal crossvein; much of cell Ax darkened; discal cell moderately broad 1.8x as long as broad, almost symmetrical, m-cu at or before discal cell.

Terminalia: male (Fig. 6a), T9 pale, basistyles dark; ventral dististyle ovoid with prominent, dark, bifurcate rostrum, the two lobes short, flat and rounded apically; no rostral setae; dorsal dististyle narrow, short, appressed to side; ventral lobe very narrow, pointed; parameres simple, very thin; aedeagus evenly attenuate to weakly bilobed and hooked tip. Female similar to *D. dohrni*.

Remarks

Alexander (1924a) described a male of *D. gibbera* Edwards 1923 as an allotype. This has no nomenclatural standing. Although *D. gibberina* is widely distributed (Fig. 9) and is known from the extensive forests near Lewis Pass, not one specimen was caught there in the 347 flight intercept traps set over a summer (see General Comments).

Discobola dicycla Edwards, 1923

Discobola dicycla Edwards, 1923, p. 287, fig. 28. Miller 1950, p. 18.
Limonia (*Discobola*) *dicycla* (Edwards); Oosterbroek 1989, p. 73.

Type locality: West Plains, Invercargill.

Material examined

Holotype female (body, one wing, one leg pinned; one wing on slide #2052, box #19, slot# 83, Alexander Collection USNM) BMNH red label circle HT, *Discobola dicycla* Edwards, det. 1921 West Plains 4.3.06. The holotype is in very poor condition on a rusty pin. 103 specimens from 72 sites (many duplicated).

Description

Body (holotype) 9 mm; wing 9.5 Colour: a dark species especially on thorax; with well defined ocellate pattern on wings, leaving an almost clear band across the wing at midlength; body colours cream, gold and brown; entire head and antennomeres dark brown; thorax (Figs. 4c,d): pronotum pale/golden with thin median brown line and narrow lateral infuscation; notum golden with median brown line expanding posteriad, humeral area infuscate, scutal lobes and scutellum infuscate, with pale median stripe; outer surface of midcoxa, and sternopleuron to mediotergite uniform dark brown forecoxa with slight infuscation on front surface, prosternite and inner surfaces of all coxae very pale; trochanters pale, legs brown with broad, subequal pale and dark brown apical rings; tibiae and tarsi brown, darkening distad; haltere pale, slightly darker mesad; abdominal tergites with broad pale centres anteriorad which are poorly differentiated posteriad, ventral sclerites pale with lateral infuscation; basistyles brown, dististyle very pale. Head: male vertex with lobe above antennae, much weaker in female; antennomeres ovoid. Thorax: few notal and no scutellar setae; all setae pale.

Wing: with extensive, well defined ocellate pattern (Fig. 5b); Sc long reaching beyond R_{2+3} fork; Rs almost rectangular at base, sometimes with small spur, Sc fork at same level as R_2 fork; discal cell very elongate and relatively narrow, 2x as long as broad, asymmetrical and cell M_2 much narrower than M_3; m-cu before discal cell; crossvein distant from margin and subequal to distal 2A.

Terminalia (Fig. 6b): male, T9 weakly bilobed only slightly weaker sclerotisation in centre; basistyle narrow, subcylindrical, basal lobe narrow conical; lower dististyle subequal to basistyle, shaped rather like a boxing glove, with a prominent rostral 'thumb' slightly spatulate and bent at apex; upper dististyle short, straight, weakly articulated and lying along outer surface of lower dististyle, its outer surface with fine tubercles; aedeagus with distinct elongate 'waist' beyond midpoint, apex with two weak lobes.

Remarks

The holotype was sent to Edwards by Anton Philpott and described by him and has his British Museum type label. However, the holotype was published as being in the Cawthron Institute, New Zealand (now partly incorporated into the NZ Arthropod Collection, Landcare Research) where the collector worked. It apparently was never returned to NZ but lent to

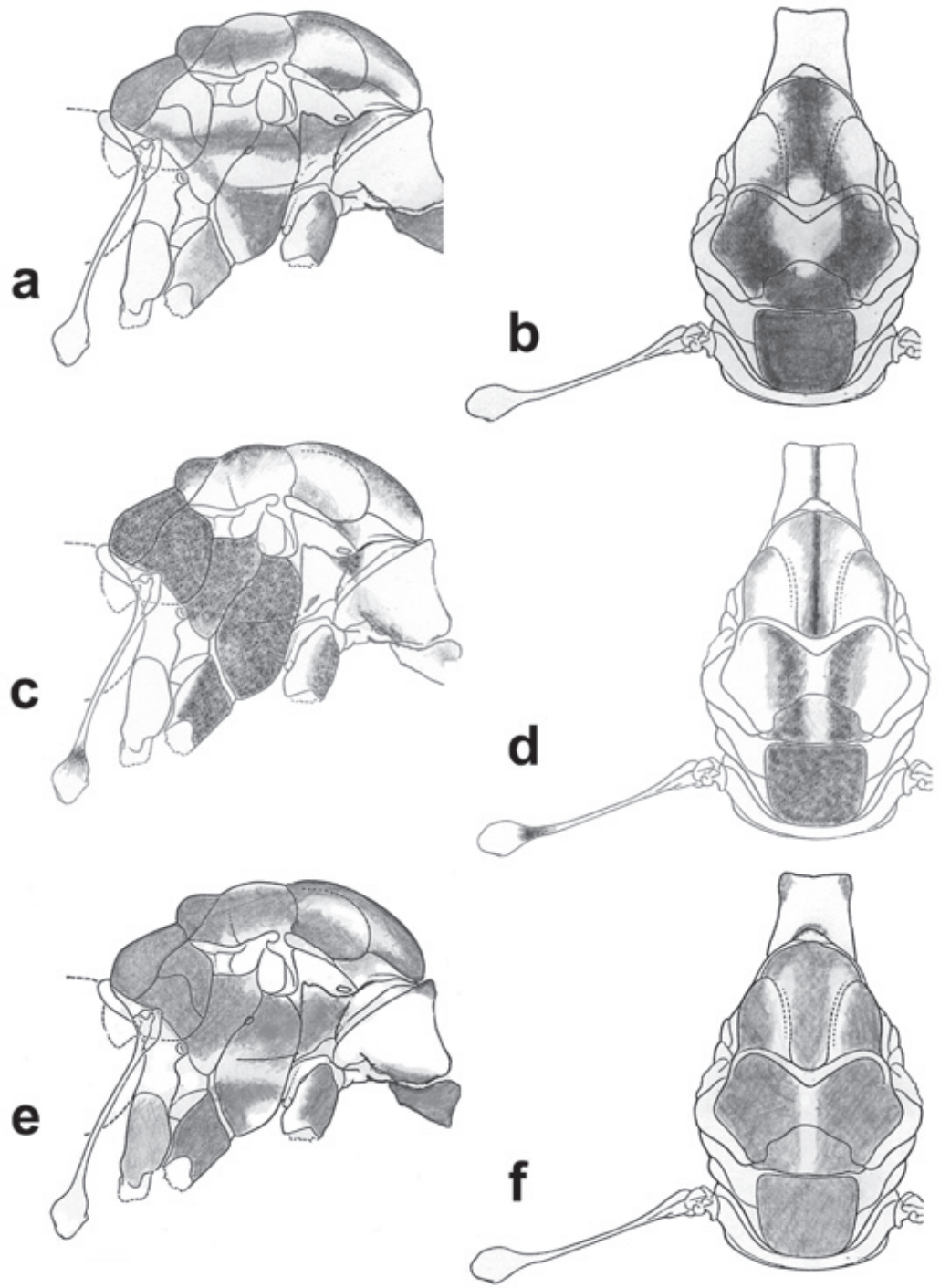

Figure 4. Thorax, in lateral and dorsal views, of **a**, **b** *Discobola gibberina*. **c**, **d** *D. dicycla*. **e**, **f** *D. haetara* sp. nov.

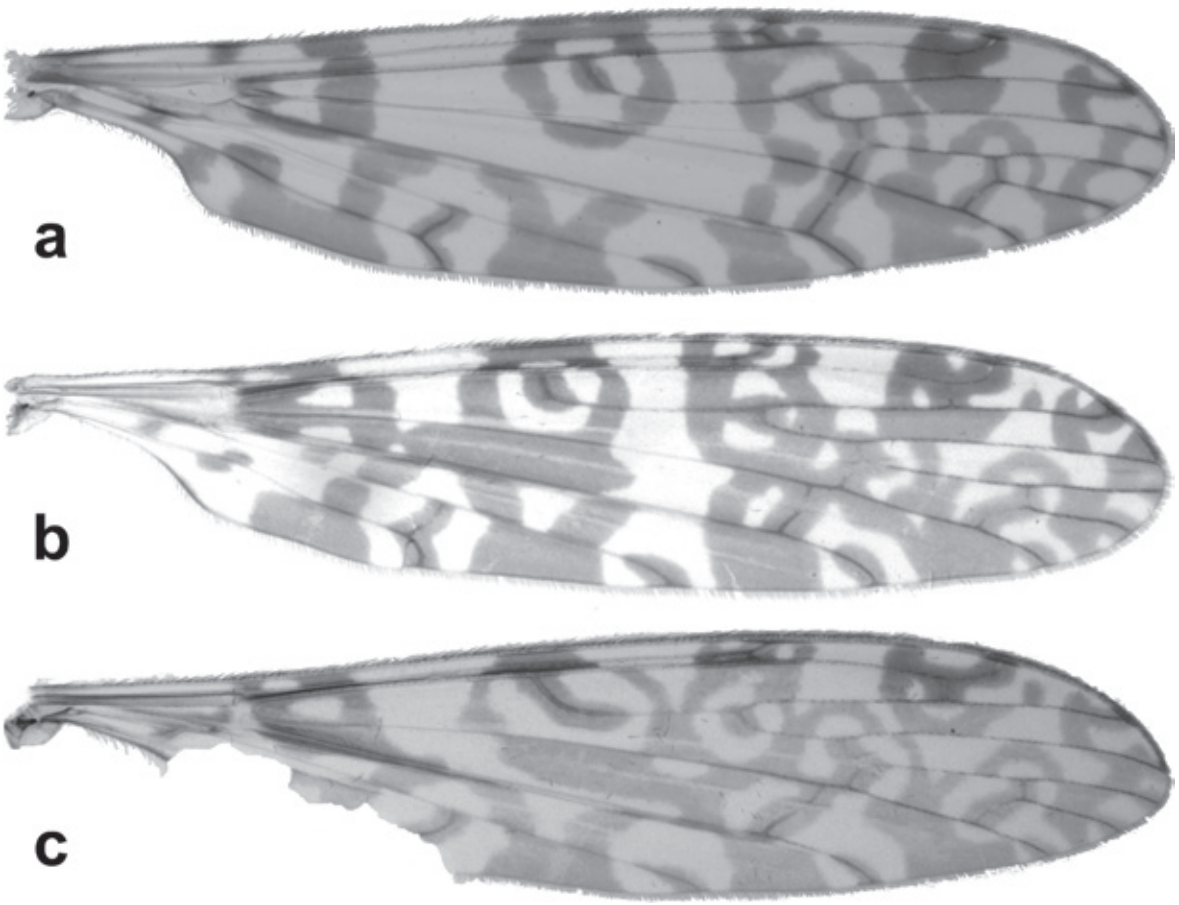

Figure 5. Wings of **a** *Discobola gibberina*. **b** *D. dicycla*. **c** *D. haetara* sp. nov. (wing damaged in Ax region).

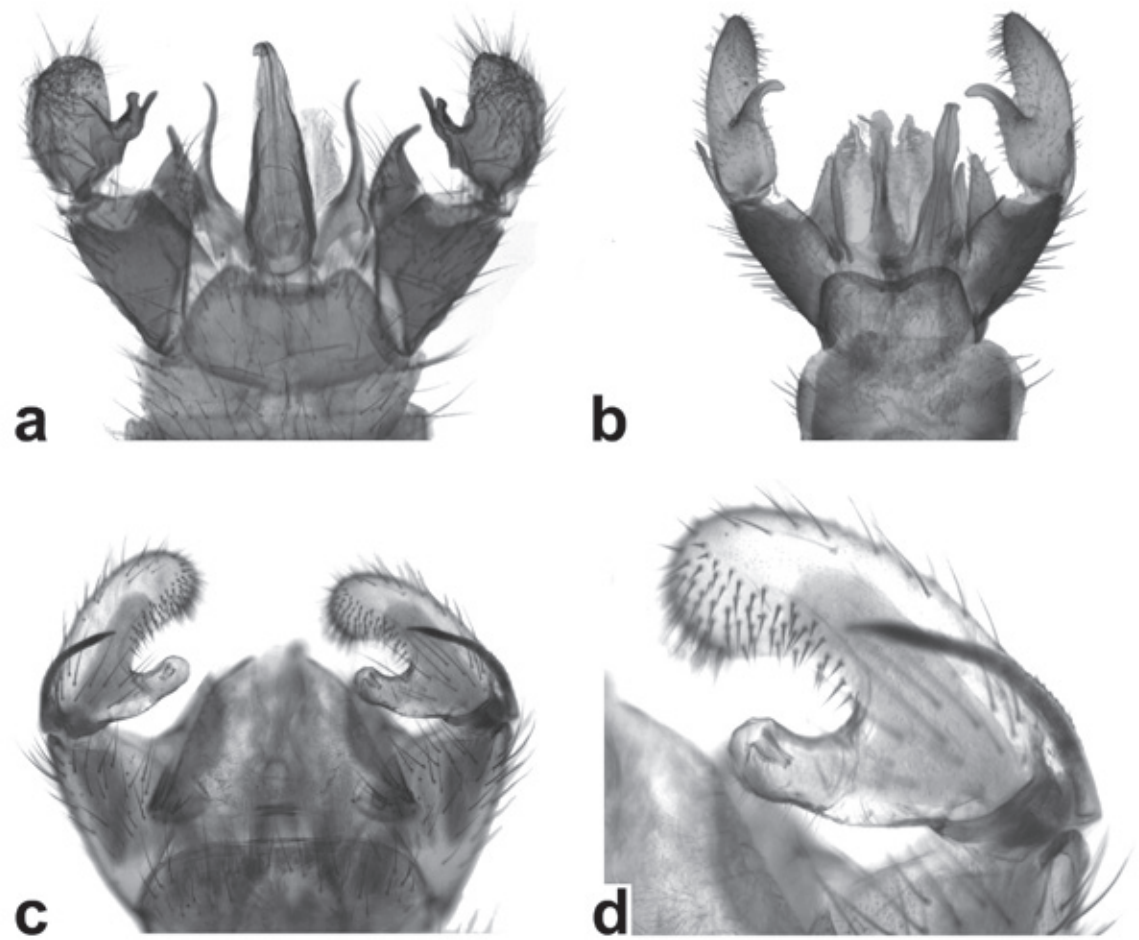

Figure 6. Terminalia of **a** *Discobola gibberina*. **b** *D. dicycla*. **c**, **d** *D. haetara* sp. nov.

Alexander in whose collection it now resides at the US National Museum. There is some concern over the identification of present specimens as the determination is based only on the wing. The holotype female was collected near Invercargill, in the far south of the South Island. All other specimens are from the central South Island 440-480 km distant (Fig. 9).

This species and *D. haetara* are very similar and features that distinguish them are noted under *D. haetara*.

***Discobola haetara* sp. nov.**

Etymology: haetara (adj. Maori): envied, admired.

Material examined

Holotype male Middle Bush, University of Canterbury Mountain Biological Station, Cass 22.iii.-7.iv.98 PM Johns, ridge malaise trap. All legs are missing, wings and terminalia are slide-mounted (CMNZ). Paratype female Hinewai, Banks Peninsula, Quiet Stream JBWard 1-20.iv.97, malaise trap (CMNZ).

Description

Body (holotype) 10.5 mm; wing 11 mm. Colour: body overall golden-brown; entire head, scape and antennomeres dark brown except pale first antennomere; thorax (Figs. 4e,f): pronotum pale cream with narrow lateral infuscation; notum golden with broad, median brown infuscation expanding posteriad, humeral area infuscate, scutal lobes and scutellum infuscate, with pale median stripe; broad, uniform dark brown band from outer surface of forecoxa, over dorsal portions of sternopleuron to mediotergite; outer surfaces of mid and hind coxae brown, the mid much darker, prosternite and inner surfaces of all coxae very pale; trochanters pale, legs pale, femur pale brown with narrow pale apical ring, a broad, dark brown subapical ring and slightly paler immediately proximad, tibia darkened at very apex; terminal 3 tarsomeres brown; abdominal tergites with broad pale centres anteriorad which are poorly differentiated posteriad, ventral sclerites pale with lateral infuscation; basistyles pale brown, dististyle pale. Abdomen with margins of tergites and sternites brown, pleural regions uniformly darker.

Head: male vertex with point above antennae; antennomeres ovoid. Thorax: few notal and no scutellar setae; all setae pale.

Wings: strongly ocellate (Fig. 5c) with extensive but rather diffuse ocellate pattern, the rings around Rs base and M forks large and fused, thus wing has no transverse clear bands; Sc short close to fork of R_{2+3}, Rs broadly convex at base, no sign of any spur; discal cell strongly asymmetrical its anterior border much longer than posterior, M_2 about half the width of M_3; m-cu at or before discal base.

Terminalia (Figs. 6c,d): male, T9 broad, very gently convex, with slight median indentation, fully sclerotised; basal lobe narrow conical; ventral dististyle very much like a boxing glove the "thumb" (which may be a highly modified rostrum) short and blunt; with a narrow pit joined to an inner gland; dorsal dististyle gently curved reaching base of "thumb", thin, and with scale-like tubercles on outer surface; paramere ventral lobe short, gently curved, apex simple; aedeagus with prominent laterodorsal lobes midway, then strongly constricted; apex with two blunted hooks. Female similar to *D. dohrni*.

Remarks

D. haetara and *D. dicycla* are very similar. They may be distinguished by the shape of Rs base, the fullness of the ocellate pattern and the male terminalia. The very distinctive pit on the "thumb" process is joined to a single gland within the dististyle, apparently a quite unique feature. Somewhat similar are the two internal glands seen in a number of *L.* (*Zelandoglochina*) species which open through paired hypodermic-like spines on the dististylar rostrum.

This is without doubt a rare species if the collecting techniques and intensity are effective. The type locality, at the University Mountain Biological Station has been studied intensively for over fifty years yet only one specimen has been found. The survey in which the holotype was taken was based on two malaise traps set within a patch of *Nothofagus* forest; one trap set close to a stream the other on a dry ridge. Both traps were operating for over a year (approx. 800 trap-days) and serviced monthly. Only one trap-month was lost due to rain dilution of the preservative and subsequent rotting of the specimens. The paratype was taken during a survey using one malaise trap over the summer months for three years (ca 360 trap-days). The two sites (Fig. 9) are 130 km apart and many malaise traps in intervening and nearby sites (eg Craigieburn and Lewis Pass) set for similar times have not yielded any specimens.

Figure 7. Distribution of *Discobola dohrni.*

Figure 8. Distributions of *Discobola striata* North Island (squares); *D. venustula* South Island (circles); *D. tessellata* (diamonds).

Figure 9. Distributions of *Discobola gibberina* (circles); *D. dicycla* (squares); *D. haetara* sp. nov. (diamonds).

TABLE 2
Distribution of species through three habitat types near Lewis Pass

species	forest ground	forest canopy	open tussock	totals
D. dohrni	8	18	2	28
D. dicycla	11	62	6	79
D. venustula	60	78	13	151

GENERAL COMMENTS

Seven species of *Discobola* are now recognised in New Zealand. *D. haetara* sp. nov. is particularly poorly understood for it is known only by two specimens. Larvae and pupae are known only for *D. dohrni*. Its larvae burrow through rotting wood of a wide variety of tree species. Only *D. striata* and *D. venustula* are regularly collected by sweep-netting. The latter species is usually associated with wetter environments and may be found in stream margin and swamp vegetation. The others are possibly all night fliers and *D. dicycla* is most likely a canopy species (Table 2). In Summer 2000-1, 347 flight intercept traps were set up at sites near Lewis Pass (Ewers et al. 2002); the numbers collected are given in Table 2. *D. dohrni* occurs throughout the year and the other species have been taken through Spring, Summer and into Autumn.

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FROM PAPANUI TO THE TRENCHES

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ABSTRACT

The experiences of two Christchurch soldiers from World War I are examined through their letters and diaries. These documents provide representative primary evidence of the perceptions of ordinary New Zealand soldiers involved in one of the central events of the 20th century.

KEYWORDS

Papanui; Gallipoli; Main Body; ANZAC; Armentieres

INTRODUCTION

The resurgence of interest in Anzac Day commemorations in New Zealand has led to renewed interest in the story of those who served at Gallipoli and elsewhere during the First World War. Canterbury Museum has a significant amount of both written and pictorial evidence about men from Canterbury who served in World War I. While pursuing research as part of a wider project called "From Papanui to Passchendaele"[1] – an examination of the military service of men who are commemorated on war memorials in Papanui, Belfast, Harewood and Coutts Island in northern Christchurch – I was fortunate enough to examine archival collections about two of the men whom I was investigating. These men kept diaries in which they recorded their experiences and confided their thoughts, and wrote letters to family, containing details that they considered suitable for the various correspondence. Such collections provide a window into the past by which we may come to understand the experiences of these men and how they perceived these novel experiences.

On 5 August 1914, Lord Liverpool, the Governor of New Zealand, stood on the steps of Parliament, surrounded by his government, and announced that New Zealand was at war and "in company with the Dominions and other Dependencies of the Crown [was] prepared to make any sacrifice to maintain her heritage and birthright".[2] These were chillingly prophetic words. Like their counterparts overseas, thousands of young New Zealanders volunteered to fight; later, thousands more would be conscripted into the army. Few families escaped the demands of the war. From a population of just over one million people, New Zealand sent over 100 000 of its young men to fight. Over 18 000 were killed or died as a result of their war service. Nearly 50 000 were wounded.[3] Among those who served in World War I were several hundred young men from Papanui. Forty of them would never return. This article examines the experience of two of these men. In a small way, these men's experiences would come to represent part of what would become the defining event of their generation.

DISCUSSION

As in other countries, news of the outbreak of war was greeted with enthusiasm. Newspapers described spontaneous outbreaks of patriotic demonstrations. Committees were formed to raise money for the war effort. On 8 August 1914, Prime Minister William Massey announced the formation of an Expeditionary Force. Within days, hundreds of men, former Territorials and new recruits, had hurried to enlist. Two of these men were Jack Leversedge and Arthur Elderton. In many respects they were typical of the type of men who did so. The Papanui district from which they came was a microcosm of New Zealand communities from which all soldiers of the time originated. Papanui was a mixture of both urban and rural. Many of the young men who lived there were imbued with a strong sense of being British by lineage and education and were swept along by the patriotic enthusiasm for war through service in the Territorials. They were linked by community bonds of family, school, work, sport and friendship. It is therefore unsurprising that young men from Papanui, like Leversedge and Elderton, volunteered in their dozens early in the war, and as it progressed, served in their hundreds.[4]

Papanui, like many other New Zealand communities, felt compelled to support and recognise these men's service. At the outbreak of war, patriotic committees were organised by community leaders. The people of Belfast held at patriotic meeting on 24 August 1914, presided over by Waimairi County Councillor S A Staples. *The Press* reported that

> Mr J.J. Dougall delivered an address, and on the motion of Mr Wm Nicholls, seconded by Mr Balch, it was resolved that the meeting should form a general committee for the object of raising funds for the Mayor's Patriotic Fund. Mr Nicholls was elected chairman of the general committee, and Mr Balch secretary. A motion of thanks to Mr Dougall for his address, and the singing of the National Anthem, closed the meeting.[5]

By mid-September, the Belfast Patriotic Committee had held a concert and other functions and collected a total of £91 16s for the War Patriotic Fund.[6] Existing charitable groups such as the Red Cross joined the patriotic groups in focussing their attention on supporting the war effort. While some of the funds were sent to relieve the hardship of displaced Belgian civilians suffering as a result of the German invasion of their country, funds were also used to provide "soldiers' comforts". Soldiers such as Jack Leversedge and Arthur Elderton were given public send-offs by their local communities, and were provided with gifts such as shaving kits or writing materials. Newspapers abound with reports of local communities fundraising for the war effort, bidding farewell to named soldiers, and later, welcoming home survivors.[7] What is not reported would have been the role of people who supported such groups in consoling bereaved families.

On 16 October 1914 men from Canterbury assembled with troops from other regions to form a New Zealand Expeditionary Force of 8574 men. It consisted of an infantry brigade of four battalions from each of the main provincial districts of Auckland, Wellington, Canterbury and Otago, a mounted rifles brigade, a field artillery brigade with three four-gun batteries, and signal, medical and supply units. With the men went 3818 horses, 10 million rounds of ammunition and 6000 rounds of artillery.[8] As this force sailed away, the men who clambered excitedly over the ships to wave goodbye to loved ones had little idea of the grim reality that awaited them in the next few months. The force sailed to Australia and joined up with men who were to form the famous Australia and New Zealand Army Corps (Anzacs).

The Main Body, as the New Zealand Expeditionary Force became known, was absorbed into a wider Allied force based in Egypt, initially to protect the Suez Canal from Turkish incursions. As the initial German attack in France had been frustrated and the situation there was evolving into static trench warfare, the Allies sought a means of breaking the deadlock. First Sea Lord of the Admiralty Winston Churchill proposed an eastern campaign – in the Dardanelles – to knock Germany's ally Turkey out of the war, and bring aid to the struggling Russians confronting the Germans on the Eastern Front. The British commander, Lord Kitchener, was unwilling to strip the Western Front of his best surviving Regular Army divisions, so the untried Australian and New Zealand Army Corps were to form part of a multinational invasion force of the Gallipoli Peninsula.

JACK LEVERSEDGE

Private John Charles (Jack) Leversedge was born on 15 March 1894. He lived with his parents - William, a draughtsman, and Rose - at their home at 147 Idris Road. Jack had received a secondary education at Christchurch Boys' High School, one of the minority of men whose parents were able to afford to provide one. Prior to the war, he worked as a clerk at the Bank of New South Wales in Christchurch. On 13 August 1914, aged 20, he volunteered along with many others, swept up in the patriotic enthusiasm of the time. He was posted to 'A' Company of the Canterbury Regiment, and sailed with the Main Body of the New Zealand Expeditionary Force on 16 October 1914. He kept a diary [9] in which he recorded his experiences and observations which provides a view of his life on active service.

On arriving in Egypt, the Main Body settled into a routine of training and sight-seeing. In one of the first entries in his small diary, on 7 December 1914, Leversedge commented that "We always wear our side arms when on leave as several fellows have been murdered. It is foolish to go down lanes by yourself here." Four days later he visited the Pyramids, and got a lift back to camp from an English manager of the Anglo-Egyptian Bank. He stated "We explained the grandeur of New Zealand, much to their wonder." On Christmas Day Jack Leversedge went to the zoo with his school friend Francis Sapsford (who was to die on the first day of the Anzac landings).

Private John Charles Leversedge in 1914 (Christchurch Boys' High School Archives).

Jack Leversedge, like many New Zealand soldiers, was not especially impressed with the larrikin image of Australians with whom he would soon serve. In a letter home to his parents, he commented that "We think very little of the Australians. They are for the most part absolute hooligans for which several have paid with their lives. I saw one nearly kill half a dozen waiters in a hotel. Most of our fellows will have nothing to do with them." New Zealanders' opinions of the Australians varied. Trooper Pocock of the Canterbury Mounted Rifles stated bluntly "The Australian, and more especially the town bred man, is a skiting, bumptious fool, who thinks nobody knows anything but himself. If we meet or see them in a restaurant or anywhere in town, there is generally a row of some sort."[10] Not all were so negative. Percy Williams, who was training to be a lawyer when war broke out, wrote, "They are the best of companions, and are a fine manly type … As independent as the devil and with the same recklessness … without any of the ranting vaunting of New Zealanders. I will be horribly surprised if they do not give a good account of themselves."[11] But most saw clear contrasts between themselves and the Australians, providing evidence for some to claim that these attitudes represented the first stirrings of New Zealand nationalism.[12]

Late in January 1915, the Turks made an assault on the Suez Canal. On 26 January, Leversedge was moved to the Canal Zone, and the next day observed that he was about 15 minutes from the fighting, but he could hear the guns and saw an aeroplane for the first time. On 2 February, he and six others were sent to guard a signalling station on the banks of the canal. He expected an attack from the Turks and was "prepared to give them a warm reception." A week later he observed that the Turks had "cleared out" and he was "very disgusted at having to go back to the drill again."

His feelings were shared by many other Anzac servicemen. Bored by constant drill, and spoiling for a fight, many of them took out their frustrations on hapless Egyptians. On 2 April, Leversedge referred to the infamous riot in the Wazzir brothel quarter of Cairo. He stated, "A rather serious riot in town this evening. It started by some Australians wrecking a house and there was a great turn to on the arrival of the red caps (military police). Subsequently about a squadron of cavalry was turned out as well as a very strong picquet."

This apparent inactivity was soon to change. The Anzacs were to form part of an amphibious Allied attack on the Gallipoli peninsula in order to secure passage by British warships through the Dardanelles. On 15 April, the Main Body moved to the island of Lemnos. Leversedge compared the harbour to Lyttelton and commented that the land surrounding some of the bays at Lemnos were "very like the Port Hills". He remained there until the Anzacs embarked on the ship prior to the landings.

On 25 April 1915, the first day of the Anzac attack on Gallipoli, most men's diaries make note of this seminal day. Leversedge "woke this morning with the sound of heavy guns in our ears and could feel the recoil for several miles." Later he noted that "Our company safely ashore whence the fun began. The Turks seemed to have a machine gun for every ten men and played terrible havoc but the bayonet was always too much for them. In the afternoon when we had advanced halfway across the Peninsula the Turks got heavily reinforced and we had to fall back to a fairly strong hill which we were able to hold." The experience of being in combat obviously made an impression on him. "The fighting was terrible at first and a wounded man would be very lucky if he was not left without attention for 24 hours." Percy Williams noted that "At one place there was a steep gully in which the enemy's shrapnel was playing in a frightful manner. I saw an Australian with two legs broken and another with a bad wound in one of his legs."[13]

That confused landing failed to achieve the objectives set for it. The strength of Turkish resistance and the lack of direction left the Anzacs clinging to a small hilly section around Gaba Tepe, while the Allied assault at Cape Helles at the bottom of the peninsula made little headway against the Turkish defences. Elements of the Main Body had been transferred from Anzac Cove south to Cape Helles to reinforce British attacks. However, daylight attacks launched over flat fields into the teeth of Turkish machine gun fire simply created massacres such as the infamous "Daisy Patch". On 12 May Leversedge referred in his diary to the Anzacs' abortive trip to Cape Helles and the losses sustained by the New Zealanders. "Since landing over a month ago we have lost a terrible

The terraces below Quinn's Post, one of the most dangerous areas on the Gallipoli peninsula. (E S Gibson photograph, Canterbury Museum, 1989.44.1).

lot of our fellows. There is only about 50 Main Body fellows left and the rest are either killed, wounded or missing." He had a lucky escape when a piece of shell struck his helmet. "I just ducked in time or it certainly would have finished me." Later in May he referred to a spell at the notorious Quinn's Post, which he described as "Not too nice a place between the firing lines. In some places our trenches are less than 10 yards from the Turks who give us an awful time with bombs." On 19 May, the recently arrived (and dismounted) Mounted Rifles Regiment took a leading role in repulsing a determined Turkish attempt to sweep the Anzacs off the Gallipoli peninsula. For the next few weeks a sullen stalemate existed. On 6 June Leversedge took part in a raid on the Turkish trenches which took "thirty or so prisoners". The Turks responded by trying to "shake us up with bombs" from which he had "several marvelous (sic) escapes". This raid caused the death of another Papanui soldier, James McArthur.[14] Two weeks later, another Papanui soldier, Albert Patrick, was killed by machine-gun fire at Quinn's Post.[15]

After a four-day rest on the nearby island of Imbros in July, Jack Leversedge returned to rumours of a "big advance shortly". On 6 August 1915, he commented, "Tomorrow will see some very lively times" and made reference to a general attack and waiting in a gully for the advance. This was the ill-fated attack on Chunuk Bair. This was an attack in which the New Zealanders would attempt to seize the high ground at Chunuk Bair, while the Australians launched a diversionary attack on Lone Pine. A large British landing at Suvla Bay was intended to reinforce Anzac gains. On 9 August, Leversedge referred to a big battle lasting for the past

Jack Leversedge on the Cashmere Hills in 1918 (Christchurch Boys' High School Archives).

three days. He observed that "Casualties have been very heavy, but we gained our objective and are hoping to hang onto it." However, this was not to be. The Wellington Regiment under Lieutenant-Colonel Malone seized and held the heights against repeated Turkish counter-attacks, only to see them lost by the inexperienced British troops who had relieved the exhausted Wellingtons. Futile attacks by the Canterbury Mounteds on a position known as Hill 60 in late August caused continuing casualties.

But by then Jack Leversedge's active service was over, even if he was not aware of it. Like many others weakened by months of survival in torrid, unhealthy conditions, his health collapsed. In his diary entry on 28 August he commented about being evacuated to a hospital ship after "feeling pretty bad for about a fortnight." He was evacuated from the Gallipoli area with many other cases of enteritis, and sent to a hospital near Manchester in England for treatment. There he described trips around the area and he apparently enjoyed a "very merry Xmas." However, in late January he noted that he was "in for a rotten time being confined indoors as civilians had contracted dysentery from soldiers." In February 1916 he was discharged from hospital and spent time travelling around England, meeting friends and relatives.

Finally Jack Leversedge was deemed to be too ill to return to active service. On 22 June 1916 he was struck off the list of the NZEF and put on the SS *Tofua* to return to New Zealand. He commented that there were "only 20 on board, so we all have First cabins and very decent tucker." On 16 October 1916 he disembarked at Port Chalmers and arrived home by train. Here his diary ends.

No evidence survives of his welcome home or ongoing community support for Jack Leversedge. Yet it is hard to imagine that his local community simply

forgot about him and others like him. Canterbury soldiers returning from the front injured or ill were often sent to the Queen Mary hospital in Hanmer to recuperate if they could. In Leversedge's case, it is clear that the breakdown of his health as a result of his service in Gallipoli was permanent, and two years' treatment at the Sanatorium in Cashmere was unavailing. Sadly, Jack Leversedge never recovered his health. He died on 24 November 1918 and was buried in St Paul's Cemetery in Papanui, along with another Papanui soldier, Thomas Claridge, [16] who also died in 1918 as a result of wounds suffered in the Battle of the Somme in 1916.

ARTHUR ELDERTON

Private Arthur Elderton (Bishop Collection, Canterbury Museum, 1923.53.342).

Arthur Elderton was born in Christchurch on 30 January 1894. His father Henry was a head shepherd on a farm in the Amberley area of North Canterbury, and a descendant of the English author Charles Dickens. Prior to the war, Arthur worked for a Papanui carrier, L Lees, and boarded with the Prebble family in Frank Street, Papanui. He volunteered for service in May 1915 and was posted to 'C' Company, 1st Battalion of the Canterbury Infantry Regiment. He arrived in Suez in November 1915 as the Gallipoli campaign was winding up. He kept a diary in which he recorded his experiences and observations. He also wrote a series of letters to his family, mainly his married brother Frederick.[17]

From Elderton, we can learn something of the training men underwent before leaving for service overseas. On 30 May 1915, Elderton wrote to his brother about the training camp at Trentham, north of Wellington. "It is a devil of a big camp. There is (sic) tents and huts all over the show and they are still building". He was unimpressed with the conditions there. "It is always raining and the mud and slush is something dreadful, and the frosts something cruel." Two weeks later, he wrote again to Frederick. "We had to leave Trentham last evening and proceed here (Waikanae) on account of the fever and the filthy state of the camp … We had every little to eat for three days, and now there is nothing but stew, we are all sick of the sight of it." His reference to an outbreak of infectious disease mirrors an experience with which Leversedge would have been familiar. An outbreak of scarlatina in the volunteers' camp in the Addington Showgrounds saw the Canterbury contingent move to a different camp in Sockburn. On 6 September Elderton commented that "We are in the fair dinkum training now, and it is fairly solid graft."

In October 1915, he left for overseas service. "We had a great farewell in Wellington, and it made one feel a bit downhearted as we said goodbye to all our friends." The journey over on the boat was an introduction to the extreme climatic conditions to which he would have to adjust. He mentioned in a letter on 29 October that "It is awfully hot, and we lay about with as few clothes on as possible, and the perspiration falls off you." Once in Egypt, Arthur Elderton took the opportunity like Leversedge to see the sights, confiding with apparent anticipation in his diary, "Hope to get into Cairo tonight, the most sinful city on earth." Like other New Zealanders, he was not impressed with some aspects of Egypt. On 28 November 1915, he wrote to Frederick, "It (Cairo) is a hell of a place, and if I was to tell you half of what I have seen you would call me a liar. You always want a descent (sic) stick with you and kick the dirty devils out of your way like dogs. The veiled and French tarts are very nice but of course you have to be

careful how you approach them." He then remarked rather wistfully, "If only a chap had the money to buy some lovely things." On 17 December, he commented that "You meet some hard cases out here, especially in the Australians, but it does not do to play the fool here, for the clink is ten times worse than our gaol, and they would not think twice about shooting a chap."

Elderton was required to be on duty over the holiday period. In a letter dated 2 January 1916, he described the experience of being on guard duty. "Our platoon is on picquet duty in Cairo for the holidays, and it is the roughest job ever I was on, for you meet some rough customers out here. The best part of it is going through all the girls' bedrooms after ten o'clock, and pulling out the soldiers, so you can guess the sights we see."

As 1916 wore on, training increased in intensity. The remnants of Main Body were reinforced by many other soldiers like Elderton to form a larger, separate New Zealand Division, under the command of Major-General Andrew Russell. "We are in a big camp near the Canal and not far from the defensive trenches, and are undergoing some pretty severe training. We are all joined up with the Main Body now, and formed into a big brigade." Presciently, he commented that, "I have met a terrible lot of old mates, only of course there is (sic) a lot of them we will never see again. I feel a bit lonely at times, for I have got no relations whatever out here, but I have got real good mates, so that is something to be thankful for."

In May, Arthur Elderton sailed with the rest of his Division for France. After landing at Marseilles, he entrained for their final destination, Armentieres. In his diary entry of 15 April 1916, he wrote "The journey last (sic) fifty hours, giving us three days and two nights on the train. It was forever interesting and one never got tired of watching the many things of interest as we passed through the countless villages and large towns." The next day he commented approvingly that, "One special feature is the beautiful women, for they are a fine stamp, and thoroughly strong and healthy, and the majority very pretty. It is quite a pleasure to mix with them after the dirty black gippos we have just left." This forthright condemnation of the Egyptians probably reflects supremacist attitudes common among Pakeha soldiery at this time.

May 1916 also brought Arthur Elderton his first taste of active service. He had remarked that he had been billeted in a pig sty near Estaires. His first real military duty consisted of being "On guard over bridge crossing River Liss (Lys) between France and Belgium. My first experience of high explosive." On 16 May, he wrote in his diary, "Went into fire for the first time. On fatigues on tram lines. Rather exciting but came through safe." On Sunday 21 May, he briefly described a common day in the front line trench. "Stood to at 2.30am. On fatigue all day, but things fairly quiet. Heavy shelling in reserves. Stand to from 7.30 to 8.30. Everything going good and not loosing (sic) any sleep." The next day he noted, "Fairly quiet day but reserves and headquarters shelled and a few wounded. Received a bit of a fright when a shell landed six feet from my bivoac (sic)."

The last week of his life seems to consist of what was typical for many New Zealand soldiers of the time.[18] On Tuesday 23 May he wrote in his diary that he had been "on fatigue and very little firing". The next day he remarked, "The same and came back into reserves at night. Raining and plenty of mud and things very miserable." The next day he spent performing fatigues around the company headquarters and then moved up into the firing line at night. He wrote that he helped "putting up a false traverse to encourage Fritz to make a charge."

His final diary entry (29 May 1916) read "Shell burst in billet, killing one, wounding several. Town (Armentieres) slightly bombarded." His last letter to Frederick on 30 June 1916 observed that "The weather is very broken and it makes things very miserable in the trench, when you are wet through, for you never undress, and you don't have a change of clothes. Things are pretty lively here at times, but we are awfully lucky, so let us hope that it will be the same right through." It was not to be. On 9 July 1916, Arthur Elderton was admitted to the No 8 Casualty Clearing Station with shrapnel wounds and died the next day. His mother received the following letter from the nursing sister who attended him.

> "Dear Mrs Elderton
> Your son 6/3008 Pte Elderton of 1st Canterbury New Zealand Regiment was admitted to this Hosp on the 9th suffering from shrapnel wounds of the abdomen. He was operated on at once and the damage to the bowel repaired as far as possible. After coming around from the anaesthetic he became restless at times & had an anxious look. He did not have a good night & yesterday morning looked much worse. He lingered on until 2pm. He was such a fine lad – it was hard to see him just slip from us. I am

deeply sorry to be the bearer of such tragic news
& to have so very little to tell except the bare
fact. I hope you may hear from someone in his
regiment.
Believe me
Yours truly
J Todd
Sister."

His mother later received a letter from the chaplain based at the 8th Casualty Clearing Station. He wrote,

"Dear Mrs Elderton
Your dear boy came to us badly wounded on the 9th & alas – in spite of all that was done he passed away on the 10th and I laid his poor body to rest in our English cemetery at Bailleul on the 11th. Dear Mother – may God himself comfort you & all your dear ones in this hour of sacrifice for – as with the Blessed Mother of Jesus – the sword has pierced your living heart.
I am asking for a photo of the grave to be sent for in due time. God rest his dear soul in Paradise.

Sincerely
Anthony F Fenn CF
Chaplain"

The Elderton collection consists of Arthur Elderton's diary, letters, copies of the telegrams from James Allen the Minister of Defence and the Governor General, and form letters from Prime Minister William Massey and Joseph Ward, along with a variety of family minutiae. It speaks of a mother who found the loss of a loved son almost too difficult to bear, and who retained every last piece of paper that connected her to Arthur. Because of this mother's grief, we are fortunate to have such an intimate glimpse into the life of one of the thousands of ordinary men from Canterbury who served in what was to become known as the Great War.

CONCLUSIONS

For many men, the experience of war represents one of the greatest challenges that may be faced. Conscious of this, many men kept diaries, or wrote detailed and descriptive letters recording their experiences and observations. Fortunately for us, many of these have survived, preserved in archives or held within families. Through these diaries and letters, we can gain a first-hand view of what it was like to be a soldier in World War I.

To the modern eye, many of these primary sources may appear less dramatic than might be imagined. There are several reasons for this, of which censorship is one of the most compelling. Soldiers' letters were censored by officers to ensure that no essential military information was being sent that could be of value to the enemy if mail were captured. Thus some letters contain passages that have been obliterated by the censor's thick black pen. On the other hand, many soldiers self-censored their letters, wishing to shield their families and loved ones from the horror which they were facing. Such letters are full of broad assuring statements about their state of health, enquiries about family and friends, with only the occasional grumble. Many would not have liked their mothers to know about the drinking and womanising that has been part of soldiers' lives since time immemorial. Arthur Elderton's letters are a good example of this type of writing. However, a few letters were more detailed and honest. The soldiers who wrote them bypassed the army postal system, and thus censorship, by asking comrades going on leave in England to post the letters using the civilian postal system. By this means, we can come to know something of the awfulness that they faced. One of these letters is by Leonard Hart, a lance-corporal in the Otago Infantry Battalion. His detailed letter written a week after the disaster at Passchendaele in October 1917, quoted extensively in Glyn Harper's book *Massacre at Passchendaele*, contains a vivid and honest account of that terrible battle.[19]

While Hart's letter is both literate and blunt, and vibrates with outrage, many letters and diaries are rather prosaic documents, rather than the detailed and shocking accounts that might be expected. A modern, more educated generation might be puzzled by this. Part of the explanation for the apparently mundane character of such primary evidence might be the nature of the writers – few men had a secondary education, and therefore might not have had the range of vocabulary and writing skill to write highly detailed and descriptive accounts. Both Leversedge's and Elderton's diaries are similar in style. Entries tended to be brief, describing their daily activities, with only the occasional deeper reflection upon what was happening to them. Another explanation for such brevity might be that the life of a soldier left little time for writing. Many diaries were written in the odd

quiet time away from front-line duty. Soldiers were often busy, and diary writing, unless important to them, might be the least important of off-duty activities compared with washing, sleeping or socializing with mates.

Compared with letters, diaries can be more personal documents for some men. Sensitive and literate soldiers could be more descriptive and confide their feelings more easily than in letters to loved ones. Most diaries were written more as a daily journal of activities, possibly as an *aide memoire* for the future. Some soldiers did write fuller accounts of their personal experiences that were published, often much later after the war. These were sometimes based on diaries and contained reflections on their experiences, their officers, the people they encountered and a host of other matters. They were generally written by quite literate people, and while the style might appear more formal than modern readers are used to, they do provide a fascinating insight into the world of the New Zealand soldier in World War I. Cecil Malthus, who later became Professor of Modern Languages at the University of Canterbury, wrote two fascinating books: *Anzac: A Retrospective*, about his experiences at Gallipoli in 1915, and *Armentieres and the Somme*, based on his service on the Western Front before being invalided back to New Zealand with a leg wound. E P (Percy) Williams' *A New Zealander's Diary* has been published posthumously, detailing his experiences from Gallipoli to the time of his death after Passchendaele. In more recent years, descendants have discovered and published the diaries of relatives who served in World War I. Jan Chamberlain's *Shrapnel and Semaphore*[20] is based on the diary of her grandfather, Bill Leadley, a Gallipoli veteran who was engaged to the sister of James McArthur. Leadley's comments concerning McArthur's death provides a revealing insight into the impact of such casualties on New Zealand families, as well as the personal faith that sustained him at that time.

There is a commonly asserted popular myth that Gallipoli in particular, and war in general, was responsible for the creation of a New Zealand national identity.[21] This assertion ignores the complexity of factors that contribute to the creation of any sense of identity. There is no doubt that New Zealand soldiers had a general sense of awareness of their distinct identity, generally expressed through contrasting themselves with the Australians. They regarded New Zealand with sentimental affection and longed to return home. Such expressions can be found in the writings of Jack Leversedge and Arthur Elderton, but it is drawing a long bow to argue that such sentiments reflect a sense of independent New Zealand national identity. It is just as easy to find expressions of Imperial attachment in the writings of the time. Defining a New Zealand identity is a slippery task at the best of times. Claims that New Zealand nationalism was born on the battlefields of the First World War ignore the many other influences, such as sport and literature, which have since contributed to the formation of a distinctive New Zealand identity.

It is entirely possible, however, that the experience of war helped to strengthen people's sense of identity with their local community rather than with the country as a whole. The emergence of groups such as the Papanui and Belfast Patriotic Committees, and the Papanui and Harewood branches of the Red Cross, provides evidence of such strengthening of local affiliation. These organisations bade farewell and welcomed back local soldiers to their community, and raised funds to provide support for local men serving overseas.[22] The people who maintained these organisations had sons, brothers, nephews and neighbours serving in the army. They were the ones who grieved with their families or their neighbours when the terrible news of a fatality was received. They were also involved in the creation of local memorials after the war. All these activities, sustained over four years, reinforced a sense of local identity.

Attendance at Anzac Day ceremonies has been resurgent in recent years. In the 1960s and 1970s interest was confined largely to returned servicemen and women but since the 1990s, 25 April has become a genuinely national day of commemoration, often with a focus on Gallipoli. The reasons for this are not clearly understood. It is possible that a new generation has a greater interest in their grandparents' experience than their parents did. Schools may have made a contribution to young people's national identity by promoting knowledge and understanding of their heritage. It is also possible that the deaths of many Baby Boomers' parents, who served in the Second World War, have led to a belated acknowledgement of the significance of their sacrifice. Some see this interest as part of a burgeoning independent New Zealand national identity. The genuine emotion expressed at the creation of the Tomb of the Unknown Warrior is evidence of this growing public awareness of New Zealand's military tradition.

Whatever the reasons, it appears that a desire to preserve the memory of those who served in the great conflicts of the 20th century is alive and well among modern New Zealanders. Many young New Zealanders

proudly wear their grandparents' medals in Anzac Day parades. Young Kiwis on their OE make an effort to wear poppies on Anzac Day, or make pilgrimages to sites such as Gallipoli and Le Quesnoy. On Anzac Day 2005, local people left wreaths or poppies on all the war memorials in Papanui, Belfast, Harewood and Coutts Island. Another method of preservation of community memory of this defining event in New Zealand's history lies within the survival of innumerable soldiers' diaries and letters, such as those that were written by Jack Leversedge and Arthur Elderton. These deserve wider circulation.

Obeying the imperatives of their time, men such as Jack Leversedge and Arthur Elderton swapped their comfortable civilian lives for the uncomfortable role of a soldier, and found themselves trapped in dreadful circumstances that cost them their lives. Through their laconic diary entries and letters, we can get a glimpse of their experiences and how they perceived what was occurring about them. Jack Leversedge and Arthur Elderton may not have enlisted expecting that their service would be remembered by their communities nearly a century later. They would surely not be unhappy that what they endured, suffered and achieved is remembered and honoured by future generations of New Zealanders

ENDNOTES

1 See www.pap-to-pass.org
2 *The Press*, 5 August 1914 p. 10.
3 See http://www.nzhistory.net.nz/war/ww1-overview
4 Ibid.
5 *The Press*, 25 August 1915, p. 13.
6 This sum would be equivalent to more than $27 000 today. By comparing the average weekly wage of a labourer in 1914 with the average modern weekly wage, £1 in 1914 would equate to approximately $295.
7 See *The Press* and *Lyttelton Times*, 7 August 1914 for details of initial fundraising. Regular updates naming communities and individuals who contributed funds, or held fund-raising activities, appeared nearly every day for the following two months, and throughout the war. *The Press*, 28 August 1914, pg 8, reported on a farewell to 6/1223A Pte John Constance (died of wounds 2 September 1915).
8 Figures quoted in Christopher Pugsley, *The Anzac Experience*, Reed, 2004, p. 63.
9 Leversedge, John Charles papers, 1993.32, Manuscripts Collection, Canterbury Museum, Christchurch, New Zealand.
10 Quoted in Pugsley p. 81.
11 EP Williams, *A New Zealander's Diary*, Cadsonbury Publication, 1998, p. 57.
12 See Pugsley p. 81.
13 Williams, p. 65
14 6/1647, Pte James McArthur, Canterbury Regiment, NZEF. Died of wounds 6 June 1915.
15 6/1952, Pte Albert Edward Patrick, Canterbury Regiment, NZEF. Killed in action 21 June 1915.
16 25/962 Rfm Thomas George Claridge, New Zealand Rifle Brigade. Died 7 June 1918.
17 Elderton, Arthur papers, 1999.6, Manuscripts Collection, Canterbury Museum, Christchurch, New Zealand.
18 For more details of daily routines in the trenches, see David Ferguson, *The History of the Canterbury Regiment 1914-1919*, Whitcombe and Tombs, Auckland, New Zealand, 1921, 90-94.
19 Letter written by 8/2004 Lance Corporal Leonard Hart OIB, 19 October 1917. Waiouru Army Museum, 2004.181.
20 Jan Chamberlain, *Shrapnel and Semaphore*: *My Grandfather's Diary of Gallipoli*, Radio Pacific Publishing.
21 See the article on Anzac Day at http://www.nzhistory.net.nz/war/anzacday and Anita Kundu's article on this at http://www.firstworldwar.com/features/newzealandnationhood.htm. She lists an extensive bibliography of New Zealand historians who have written on the issue of the evolution of a distinctive New Zealand identity.
22 *The Press* reported such events on a regular basis. For example, a report in the "Country Notes" section on Pg 4 of 15 June 1915 refers to a "Smoke Concert" held at Belfast to farewell Ptes J Neal and W Inns (Killed in action 21 September 1916).

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A FOSSIL DIVING PETREL (AVES: PELECANOIDIDAE) FROM THE MID-MIOCENE OF NORTH CANTERBURY, NEW ZEALAND

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ABSTRACT

A portion of a distal avian ulna discovered in the Double Corner Shell Beds (Waiauan; mid-Miocene) of North Canterbury, New Zealand, is described and attributed to the recent petrel genus *Pelecanoides*. This is only the second record of this genus from the New Zealand Miocene. We suggest this fossil may be ancestral to modern New Zealand taxa.

KEYWORDS

Diving petrel; *Pelecanoides*; Double Corner Shell Beds; Waiauan; Miocene; New Zealand

INTRODUCTION

Procellariiformes is the order of tube-nosed seabirds that includes four extant families: Pelecanoididae (diving petrels), Procellariidae (shearwaters, petrels, and fulmars), Diomedeidae (albatrosses), and Hydrobatidae (storm-petrels) and possibly one or two extinct families. They are of global distribution and species are generally pelagic scavengers or planktivores.

The fossil record of Procellariiformes is limited and its interpretation problematic, due to fragmentary material. The Lance Creek Formation (Late Cretaceous; Maastrichtian) in Wyoming has revealed two seabirds described in the genus *Lonchodytes* Brodkorb (1963a). Hope (2002) argued that *Lonchodytes* is likely to be a procellariiform (most closely resembling Procellariidae). However, all of the characters cited by Hope are homoplastic and appear in a wide range of unrelated diving birds (Storer 1960). Similarly aged and enigmatic is a fragmentary clavicle from the Nemegt Basin in Mongolia, which Kurochkin (1995a, b) assigned to Diomedeidae.

Undisputed Procellariiformes and petrel-like forms are recorded in Eocene deposits from Uzbekistan, Louisiana, and perhaps the London Clay (but see Mayr et al. 2002). In the mid-Eocene of Uzbeckstan, *Murunkus subitus*, based on a carpometacarpus, has been placed in Diomedeidae (Panteleyev and Nessov 1987). From the late Eocene of Louisiana, Olson and Parris (1987) described *Tyttostonyx glauconiticus*, which they placed in its own family, the Tyttostonychidae, suggesting it to be a proto-Hydrobatid, a diagnosis with which Feduccia (1996) concurred. A distal tibiotarsus from the same late Eocene deposits is morphologically similar to the extant genus Pterodroma in the Procellariidae (Feduccia and McPherson 1993).

Procellariidae are reliably reported in the Oligocene. "*Larus*" *raemdonckii* from the early Oligocene (Rupelian) of Belgium was placed in the extant genus *Puffinus* (Procellariidae) by Brodkorb (1963b). Also from the Rupelian of Europe are various members of the Hydrobatid-like genus *Diomedeoides*, which have been placed in their own family Diomedeoididae (see Mayr et al 2002).

The fossil record of true Hydrobatidae and Pelecanoididae is much younger. The earliest storm-petrel is from the late Miocene of California (Olson 1985a) and, until recently, the earliest record of diving petrels was a fragmentary specimen from the early Pliocene of South Africa (Olson 1985b). Worthy et al. (in press) have described a diving petrel differing little from modern species from the early to mid-Miocene (Altonian; 16-19Ma) of southern New Zealand. Here we describe a record of a diving petrel from the South Island of New Zealand from the mid-Miocene (Waiauan) of Canterbury.

MATERIAL AND HORIZON

A small, incomplete distal right ulna of a petrel, broken apparently pre-deposition, approximately half-way down the shaft, was found by one of us (AAM) in 1989 in the Double Corner Shell Beds exposed in cliffs overlooking the lower Waipara River, North Canterbury (Fig. 1). The specimen was initially identified as a prion, *Pachyptila*, species by Ron Scarlett and placed in the collections of Canterbury Museum until a recent move of the collections brought the specimen to our attention again. For the purposes of this study, the bone was freed from the surrounding matrix and comparative skeletons were taken from the collections of Canterbury Museum.

GEOLOGICAL SETTING

The Double Corner Shell Beds crop out along the banks of the Waipara River in the vicinity of the Horseshoe Bend (Fig. 1). They comprise about 45 m of brown, fine-grained, poorly lithified sandstone with shelly layers packed with abundant molluscs, less common echinoids, corals and barnacles, and rare vertebrate remains, including cetaceans, sharks and birds (Browne and Field 1985). Deposition is interpreted to have taken place in a shallow-water, near shore setting subject to wave and current action (Gregg 1959). The unit rests conformably on the Tokama Siltstone that was deposited in relatively deeper water, and the shell beds are thought to represent the final filling of the Tokama basin (Browne and Field 1985).

The Double Corner Shell Beds have been dated as Waiauan (mid-Miocene, 11-13 Ma) on the basis of their contained Mollusca (Gregg 1959) and from microfaunal evidence from the nearby Dovedale area (Wilson 1963).

SYSTEMATIC DESCRIPTION

Order PROCELLARIIFORMES Fürbringer, 1888
Family PELECANOIDIDAE Gray, 1871

Genus *Pelecanoides* Lacépède, 1799

***Pelecanoides* sp.**
(Fig.2 a-f)

Referred specimen

Canterbury Museum Zfa 28, accession number 1989.187.2, the distal end of a right ulna.

Locality

On the true left bank of the Waipara River about 1 km downstream from the apex of Horseshoe Bend and about 2 km upstream from Greenwood's Bridge; grid reference, NZMS 260 series map N34/919884; New Zealand Fossil Record File number N34/f0110.

Dimensions

Length (broken) 17.63 mm; greatest width (caudal-ventrally) 4.96 mm; greatest depth (dorso-ventrally) 3.79 mm

Description and comparison

The osteological terminology used below is from Baumel and Witmer (1993).

Diagnostic features to family

The cranial margin of the tuberculum carpale is separated by a shallow sulcus from the facies dorsalis and has a proximal origin on the shaft level with the proximal end of the condylus dorsalis. This combination of features appears to be synapomorphic to the Procellariiformes with all other families examined not having a shallow sulcus separating the tuberculum carpale from the facies dorsalis and most having the tuberculum carpale with a distal origin on the shaft (ie. Charadriiformes; RPS pers obs.). There is a distinctive incisura tendinosa that is deep and V-shaped causing the tuberculum retinaculi to be unusually prominent. Within the Procellariiformes, this feature is synapomophic to the Pelecanoididae (RPS pers obs.) and in particular is absent from the otherwise similar genus *Pachyptila*. Papillae remigales are visible on the shaft that remains but only microscopically, a feature common to modern Pelecanoididae. Among other Procellariiformes, *Diomedea* and *Thalassarche* (Diomedidae), and *Procellaria*, *Pterodroma* and *Puffinus* (Procellariidae) have obvious papillae, whilst papillae are apparently absent or only visible microscopically in *Pachyptila* (Procellariidae) and *Pelagadroma* (Hydrobatidae).

Features that allow comparison within the Pelecanoididae

Extremitas distalis closely resembles recent *Pelecanoides urinatrix* (Gmelin) (Fig. 2g-i) and *P. georgicus* Murphy and Harper (not illustrated). The trochlea carpalis is broad with the condylus dorsalis ulnaris extending proximally approximately twice the length of the condylus ventralis ulnaris (Fig. 3b) and the groove between the two forms a shallow rounded sulcus

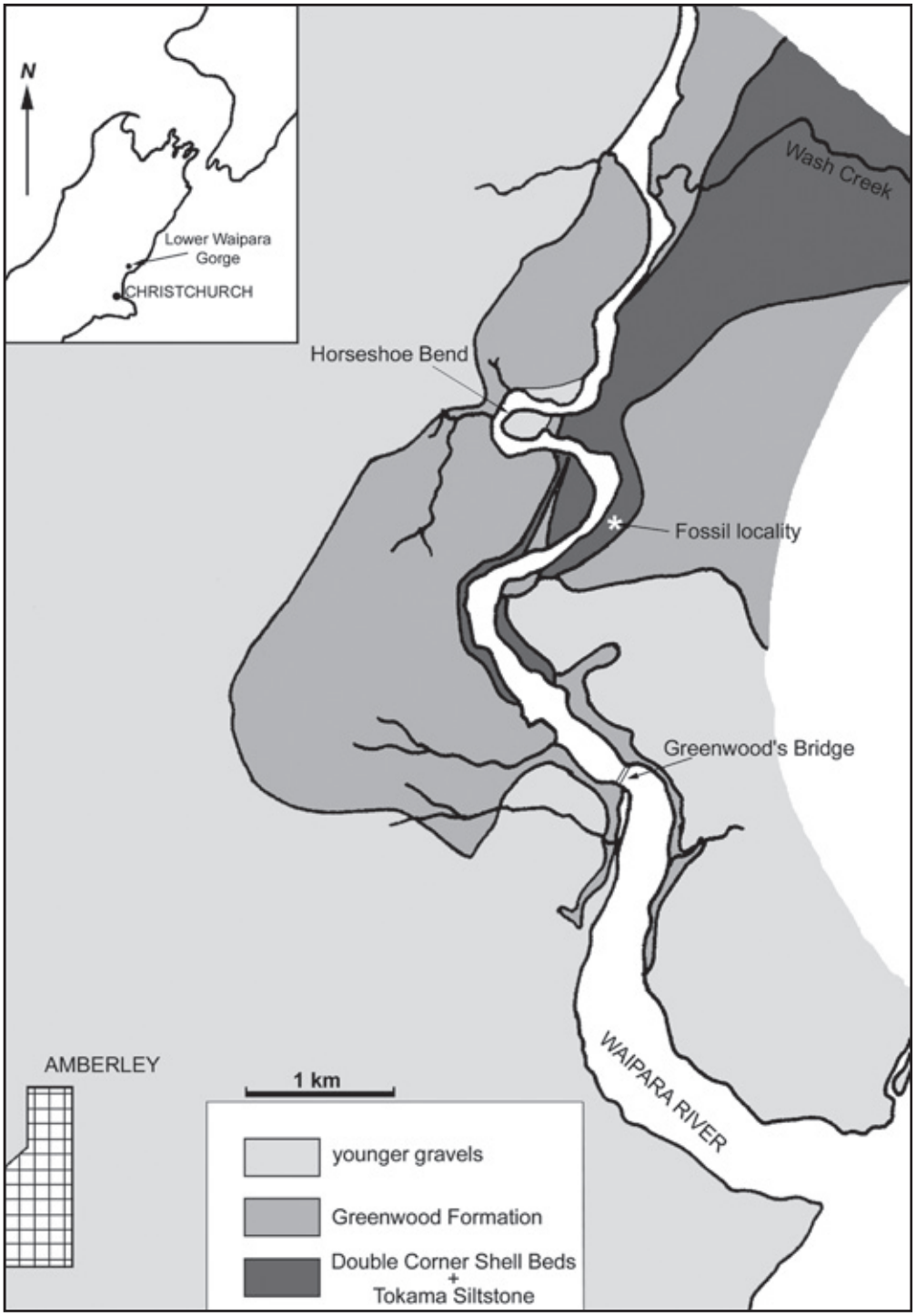

Figure 1. Simplified geological map of the Lower Waipara Gorge area showing the outcrop of the Double Corner Shell Beds and Tokama Siltstone, and the site from which Zfa 28 was recovered. Redrawn from Gregg 1959.

Figure 2. Comparative images of putative *Pelecanoides* sp. from the mid-Miocene of New Zealand and a Recent *Pelecanoides urinatrix* from New Zealand. **a-f** *Pelecanoides* sp. Zfa 28. a, facies caudo-dorsalis, corpus et extremitas distalis; b, facies caudo-ventralis, corpus et extremitas distalis; c, facies caudo-ventralis, extremitas distalis; d, facies caudo-dorsalis, extremitas distalis; e, facies cranialis extremitas distalis; f, distal aspect. **g-i** *Pelecanoides urinatrix* Av 23158. g, facies caudo-dorsalis, extremitas distalis; h, facies cranialis extremitas distalis; i, distal aspect. Scale bars = 5 mm.

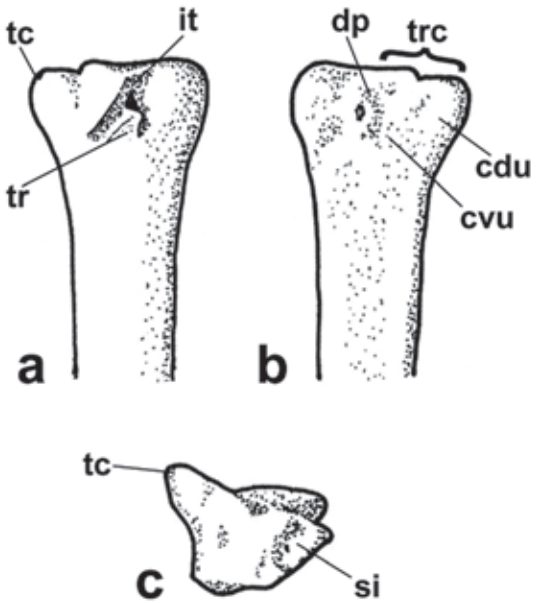

Figure 3. Diagram illustrating the salient osteological features of Zfa 28. **a** facies caudo-ventralis. **b** facies caudo-dorsalis. **c** distal aspect. Abbreviations: **cdu**, condylus dorsalis ulnaris; **cvu**, condylus ventralis ulnaris; **dp**, depressio radialis; **it**, incisura tendinosa; **si**, sulcus intercondalis; **tc**, tuberculum carpale; **tr**, tuberculum retinaculi; **trc**, trochlia carpalis.

intercondalis (Fig. 3c) that continues onto the distal surface. In recent Pelecanoididae the sulcus intercondalis is a well defined V-shaped groove that gives the rim of the condylus dorsalis ulnaris (Fig. 3b) a sharp edge. The depressio radialis is large, roughly oval and deeper than in recent *Pelecanoides* whilst the distal margin of the tuberculum carpale is distinctly offset proximally from the distal margin of the trochlea carpale (eg compare Fig. 2c and d with 2g and h). This is a feature not found in any recent *Pelecanoides*.

Zfa 28 is similar in size to the ulna of *P. georgicus* and slightly smaller than that of *Pelecanoides urinatrix chathamensis* Murphy and Harper. In all modern taxa examined, eg *Pelecanoides u. chathamensis*, P. *u. exsul* Salvin, 1896, *P. u. urinatrix* (Gmelin, 1789), *P. georgicus*, and *P. garnotii* (Lesson, 1828), the ulna has the diagnostic deep V-shaped incisura tendinosa that causes the tuberculum retinaculi to be unusually prominent. All recent taxa examined have large "ear-shaped" tuberculum retinaculi whilst the tuberculum retinaculi of Zfa 28 is more "nose-shaped".

Ulnae of *P. magellani* (Mathews, 1912) were not examined, but as this taxon is considered close to *P. georgicus* and as *P. garnotii* is the most divergent of modern forms (Penhallurick and Wink 2004) yet still has identical distal humerus morphology to the others (Worthy et al. in press), we consider it unlikely that *P. magellani* will differ from modern taxa in ulnae morphology.

The Waipara specimen could not be compared directly with *Pelecanoides cymatotrypetes* Olson, 1985 of Early Pliocene age from South Africa, which was diagnosed on features of the proximal humerus and coracoid. However, *P. cymatotrypetes* does not differ in any other way from the modern taxa (Storrs Olson pers comm. to Trevor Worthy, 26 June 2004) and is of similar size to *P. u. exsul* and so is larger than Zfa 28.

The Waipara fossil (11-13Ma) is not only geologically very much older than any other known diving petrel fossil specimen except that recently found in the Manuherikia Group (Worthy et al. in press), but it is qualitatively distinct from all modern *Pelecanoides* species. However, as the Manuherikia Group specimen will be diagnosed on two partial humeri (Alan Tennyson pers comm. 31 Aug 2006) it will not be possible to compare this species with Zfa 28. Thus currently it is unknown whether this form is more closely related to any one of the modern taxa. However, as modern members of this group have low vagility, we consider it to be likely that Zfa 28 is an ancestor of one of the modern New Zealand taxa.

DISCUSSION

The osteology of distal procellariiform ulnae has rarely been discussed in the literature (Garrod 1881; Fürbringer 1888; Shufeldt 1888; Pycraft 1898; Harrison 1977). In Figure 3 we illustrate the salient features. Zfa 28, the second record of the Pelecanoididae from the Miocene of New Zealand, indicates that diving petrels were well established in the Southern Hemisphere by 10-15 Ma. Their presence in New Zealand and the absence of any diving petrel material from the extensive shallow marine sedimentary rocks of the Miocene and Pliocene Lee Creek Mine site (Olson and Rasmussen 2001), or anywhere else in the Northern Hemisphere, suggests not only a southern origin for the evolution of this group but also a lack of dispersal north of the equator.
This find highlights the importance for vertebrate palaeontology of the Waipara region of North Canterbury. Late Cretaceous sediments in the upper valley have produced plesiosaurs and mosasaurs, whilst the Double Corner Shell beds have produced

bony-toothed bird (Odontopterygian = Palagornithid) material (Scarlett 1972). New species of penguins in the genus *Waimanu* have recently been described from the early Paleocene (Slack et al. 2006).

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DAVID MACMILLAN - AN ENTHUSIASTIC HISTORIAN

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ABSTRACT

In 2001 Canterbury Museum was gifted a manuscript/pictorial collection from the estate of Dr David MacMillan (1897-1983). This collection does not contain personal items that tell us who David MacMillan was but rather it contains items that were collated for a publication surrounding the life of Edgar Fraser Stead (1881–1949) who was world renowned for his work in ornithology and horticulture. In the act of collating these manuscript/pictorial items, David MacMillan preserved a portion of Canterbury's past that is very significant to Canterbury Museum. This article reflects upon the life of Dr David MacMillan, his historical publications and introduces readers to the David MacMillan Collection held at Canterbury Museum.

KEYWORDS

Dr David MacMillan; Edgar Fraser Stead; David MacMillan Manuscript Collection; Vertebrate Zoology Collections; Canterbury Museum

INTRODUCTION

Dr David MacMillan was a successful and respected gynaecologist, a long time member of the North Canterbury Hospital Board and a historian. He published a number of notable historical books and newspaper articles that focused on medicine, the development of Canterbury and natural history. His articles were published in various local newspapers, including *The Lyttelton Times*, the *Akaroa Mail Newspaper* and *The Press*[1]. MacMillan was always willing to assist other historians with their research and there are many who remember with great fondness the generous time he gave them while they were involved in their own research on social history (Richard Greenaway, pers. comm. April 2006).

David MacMillan was born on 5 August 1897 at Pauri Bank farm, Waddington, Canterbury. He was the son of David MacMillan, a prominent local farmer, and Margaret Annie (née Colthart). He was educated at Waddington School and Christchurch Boys High School, which he attended from 1911–1915. He studied medicine at the University of Otago from 1916–1920 and from 1921-1922 was a resident at Napier and Wanganui hospitals. MacMillan qualified MB ChB in 1922 and at the end of that year he bought a general practice from Dr J J Simpson in Darfield, Canterbury.

In 1925, David MacMillan married Beatrice Hope Dobson. Beatrice was the daughter of EH Dobson and Beatrice (née Potts) and the granddaughter of Edward Dobson, a well known Canterbury Provincial Engineer, and also Thomas Henry Potts, a well known ornithologist and naturalist. As a GP in Darfield, MacMillan developed an interest in obstetrics and gynaecology and in 1929 he went to England for postgraduate work in this specialty. In London, he was a house surgeon at the Samaritan Hospital for Women in 1929 and 1930, and a registrar in gynaecology at King's College Hospital, also in 1930.[2]

When the MacMillan family returned to New Zealand in 1932, David MacMillan pursued a career in obstetrics and gynaecology. From 1935-1956, he was assistant gynaecologist to Dr Mark Brown at Christchurch Hospital and from 1947-1974 he was on the North Canterbury Hospital Board.[3] In 1956 he was the first Director of the Gynaecological Department at Christchurch Hospital, a position he held for two years before becoming Honorary Consultant Surgeon to the North Canterbury Hospital Board.[4]

David MacMillan's ability as an obstetrician and gynaecologist were well recognised throughout Canterbury and the loyalty of his patients was quite remarkable. According to colleague and friend, Dr Patrick Cotter, MacMillan was a man of enormous energy who was always able to maintain a keen sense of humour and was both a challenging and stimulating

teacher of undergraduate students (Dr Patrick Cotter pers. comm. April-June 2006).

HISTORICAL PUBLICATIONS

In the wider community, David MacMillan is best remembered for his published books, historical writings in newspapers and his enduring contribution to other local historians who actively sought his expertise on matters relating to Canterbury social history. MacMillan constantly provided reference sources for any writer in this field (Richard Greenaway, pers. comm. April 2006) and according to Gordon Ogilvie (1983) many regional historians will remember with gratitude MacMillan's readiness at any time to assist with research problems. There were few historical works produced in Canterbury preceding the Second World War that did not give credit to MacMillan for their material.[5]

In 1943, David MacMillan published a limited edition book entitled *Obstetric Cases*, in which he described obstetric problems within his own practice, and how he handled them.[6] His 1946 book, *By-Ways of History and Medicine*, with special reference to Canterbury, New Zealand, was another limited edition. MacMillan's reason for publishing this book was not for profit but rather for its record. It is an intriguing account of early Canterbury days, the history of local Maori, and the medicinal practices of the early setters. It covers topics such as early medical literature, foreign interests, early Christchurch, European-Maori contacts, the Ngai Tahu grievances, Maori lore and Maori health. MacMillan dedicated this publication to William Anderson Taylor, whom he described as a historian, a friend of Maori and the man who knew more of early Canterbury records than any living person.[7]

In 1950, a three-volume history of Canterbury was produced to commemorate the province's centenary and David MacMillan, along with Neville C Phillips and William James Gardner, were members of the Canterbury Centennial Historical Association Committee who edited the publication. Historical accounts examined in these volumes address the development of the province until 1950 and accordingly the three volumes should be thought of as a single work that has been divided for the reader's convenience, as the topics covered are vast.[8] Volume one begins with the Land of Canterbury, Maori and European to 1850, the Maori to 1940, Whaling, the French at Akaroa, the Canterbury Association, and the end of the Canterbury Association. Volume two explores the superintendency of various men including JE Fitzgerald (1853-1857), WS Moorhouse (1857-1863; 1866-1868), Samuel Bealey (1863-1866) and William Rolleston (1868-1876). Other topics include aspects of cultural life in Canterbury, such as literature, music, art and architecture. Volume three examines transitional periods in the development of Canterbury from 1874-1950, including businesses during the depression, farming, industry in town and country, land acquired and leased under Land for Settlements Act, and Returned Servicemen settlements 1912-21. At the time of its publication, this collection was considered to be a definitive compilation of information about the development and history of Canterbury.

In addition to the publications that MacMillan either wrote or edited, it is also acknowledged in *The Dictionary of New Zealand Biography* (Vol. 4)[9] that David MacMillan was instrumental in providing support for George Ranald Macdonald (1891-1967) in compiling *The Macdonald Dictionary of Canterbury Biographies*. This is a unique collection of personal files relating to early Canterbury people, which is housed in the Documentary Research Centre at Canterbury Museum and accessed by hundreds of researchers every year. When this collection was first presented to Canterbury Museum in 1964, personal information collated by George Macdonald was in the form of index cards that were eventually transferred onto microfiche and have since become computerised.

David MacMillan's literary efforts were substantial and his historical articles published in local newspapers during the 1950s still provide invaluable information for local historians (Colin Amodeo pers. comm. April 2006). MacMillan's columns in the *Akaroa Mail Newspaper* included subjects like 'Nature Notes' in which New Zealand flora and fauna, bird watching and bird problems,[10] to name a few, were written about. Another column entitled 'Historical Series' featured articles that examined Akaroa and Banks Peninsula, gold mining and the West Coast.[11] He also researched prominent people of Canterbury, for example Dr Alfred Charles Barker.[12] Another column that MacMillan wrote, entitled "Looking Back", featured controversial subjects such as "The Kea" in which MacMillan discussed issues surrounding the export of live native birds to offshore destinations like England and America.[13]

In addition to his medical work and historical writing during the 1950s, MacMillan became increasingly interested in natural history and he frequently wrote

articles for local newspapers. According to his daughter Bryony, these interests gave him many days of enjoyable observations on the river beds, estuaries and hills of Canterbury, and the streams of the Mackenzie Country and North Otago were among his favourite places.[14] Articles he published in The *Akaroa Mail Newspaper* were presented as part of the manuscript collection in 2001 and are in their original state as compiled by David MacMillan.[15] The following extract gives readers an idea of MacMillan's enthusiasm for the natural environment and also his sense of humour. Permission has been granted to publish the following extract by Michael de Hamel (editor, *Akaroa Mail Newspaper*).

NATURE NOTES

Flora and Fauna

My object is to describe the fauna and flora of New Zealand, and the factors concerned in ecology. Ecology is the branch of biology which deals with the mutual relations between plants and animals and their environment.

The joy of a walk in the country with a knowledgeable companion, once experienced, is not easily forgotten. As time goes on, the country appeals more and more to the town-dweller. Soon, however, the senses are satisfied and the intelligence asks questions. We wish to know more about the birds, about farming activities, about the seasons, and about a host of other country activities. Fifty years ago the average New Zealander, noting a fine morning, would remark; "What a lovely day! Let us go out and kill something." Fishing rods, guns and dogs were the usual accessories of a day in the field. As the years pass these are being replaced by the binoculars, camera and field note book. Naturalists now study conservation, ecology, soil fertility, forest protection, and other important aspects of national life. From simple beginnings some men go on to become specialists in certain branches, such as ornithology and entomology.

Definition

What is a naturalist? An Irishman defined a naturalist as a man who looks like a poacher when talking to gentlemen, and a gentleman when talking to poachers. It is quite true that the would-be naturalist must throw off the inhibited responses of town-bound minds. There is nothing namby-pamby about a naturalist. In the animal and vegetable kingdom, Nature is never kind and never just. Nature is ruthless, with one great aim to which all else is subsidiary, namely, the continuation of the species, and everything works to that end, directly or indirectly. The consequence is that animals thrive and survive only by constant work and eternal vigilance.

The Young Naturalist

Many boys and girls are born with a natural curiosity about human beings and their activities. Others show more interest in fauna and flaura (sic). The latter should be encouraged by those responsible for their education. The aim should be to teach the boy nothing which he will have to "unlearn" as his studies advance. In other words, it is very important to avoid sickly sentiment when describing the fauna and flora. The young naturalist must have two kinds of books, reference books and what might be termed "stimulating books". Reference books need not be detailed but they must be accurate and authoritative. Perhaps the best New Zealand books are *New Zealand Nature Study*, *The Flora of New Zealand*, and *The New Zealand Nature Book, Volume 1 - The Fauna*. Perhaps the best example of a stimulating book is E F Stead's *Life Histories of New Zealand Birds*.

IMPORTANCE OF THE DAVID MACMILLAN COLLECTION, ARC2001.12

David MacMillan was a close friend of Edgar Fraser Stead (their wives were related) who was a renowned figure in both ornithology and horticulture. When Edgar Stead died in 1949, MacMillan acquired manuscript items from Edgar's son Roland and planned to publish a memoir dedicated to the life of Edgar Stead (Roland Stead, pers. comm. August 2006). Unfortunately, this never happened. There is no personal information about David MacMillan within this collection and all items relate to Edgar Stead. It includes draft copies of MacMillan's unpublished memoir, but more significantly there are original diary pages written by Edgar Stead that relate directly to a number of vertebrate collection items held at Canterbury Museum, including the Okarito whale skeleton and the Stead bird skins and eggs collection.

The existence of the diary pages came to light following an enquiry by Dr Colin Miskelly[16] in April 2006, when he was seeking information on the now extinct Stewart Island snipe, *Coenocorypha aucklandica*

iredalei. In June 2006, I discovered that in the diary pages, from November to December 1931, Stead made several references to the extinct snipe while on Big South Cape Island, including descriptions of how five nests were found (Miskelly and de Lange submitted ms).[17] Canterbury Museum has in its Stead bird and egg collection eight extinct snipe eggs, the only examples believed to be in existence (Paul Scofield, Curator of Vertebrate Zoology, pers. comm. 2006).

The contents of this collection are a potential treasure trove and the Stead family has had a long association with Canterbury Museum. According to Paul Scofield, the Stead Collection of bird skins and eggs is the cornerstone of the Vertebrate Zoology collection. However, the contents of the David MacMillan collection will be the focus of a future publication as it has been recognised that through this collection Dr David MacMillan has collated a very important portion of Canterbury's past that is inextricably connected to Canterbury Museum.

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David MacMillan, approximately 1930 (Photograph courtesy of Cotter Medical History Trust).

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TE KOTUITANGA O NEHERA: NEOLITHIC NEEDLEWORK IN AOTEAROA

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ABSTRACT

Maori sewing is an under researched area of indigenous technology despite a variety of available evidence in the form of sewing tools and stitched items of clothing. Examining material evidence in six museums has revealed both a range of different sizes and shapes of needles, and two different types of seam. The established indigenous knowledge ceased to be practised and along with its associated technology, has been forgotten. Similar practices amongst other Polynesian peoples may help to recover the lost technology and may also shed light on migration patterns.

KEYWORDS

Maori; sewing; needles; seams; kahu kuri (dog-skin cloaks); bird skin; seal skin

INTRODUCTION

The skill and versatility of Maori weaving is widely known; conversely, not many people are aware of Maori sewing. Nonetheless, long before the arrival of European explorers, Maori had a well developed range of sewing expertise. Over time, this aspect of indigenous knowledge has been forgotten, and its very existence has been doubted. Furthermore, despite a wide range of readily available evidence, the topic has been under researched. This paper begins the process of rediscovery by examining collected items of material culture, inspecting excavated tools and analysing stitched materials, and placing these beside traditional evidence.

KAHU KURI (DOG-SKIN CLOAKS)

The most obvious of Maori stitched garments were the highly valued kahu kuri. When James Cook first visited New Zealand in 1769, members of his expedition recorded the dog-skin cloaks that they saw chiefly figures wearing. On that initial voyage, the artist Sidney Parkinson sketched a number of examples. During the late eighteenth century, a number of cloaks were traded by Maori and eventually entered collections in European museums. Some of these cloaks were entirely overlaid with vertical strips of dog skin; other collected garments were trimmed with small strips of dog skin at the hemline, edging their taniko borders, or simply ornamenting the lower front corners of otherwise unadorned cloaks.

Kahu kuri continued to be worn by chiefs in the nineteenth century. They were portrayed by artists such as Augustus Earle, George French Angas and later by Gottfried Lindauer. These prestigious cloaks were distinctive garments that still exhibit a competent level of sewing practice.

The majority of kahu kuri were made with a whatu kaupapa of muka or whitau (a base of weft-twined harakeke fibre) that was overlaid with rows of narrow-cut strips of dog skin. The strips were generally laid with the pile or hair running down towards the hemline of the garment, creating the appearance of a large single pelt garment. When early British and French explorers saw these items being worn, they recorded that they initially assumed the garments might be of bear skin.[1]

Although the procedure of overlaying fur strips could be accomplished during the weaving process, the majority of cloaks examined have their strips attached by horizontal, parallel lines of neatly regular stitches, using muka fibre. The strips were carefully applied so that the dog hair would conceal the sewing, thereby achieving the effect of an entire fur garment; the technique can be clearly observed in collected cloaks which have partial damage. The precision of such rows of stitching, combined with an abundance of archaeological evidence in the form of bone needles that have been found throughout New Zealand, establish beyond doubt that Maori had a history of sewing.

SEWING NEEDLES

The history of Maori sewing goes back at least 700 years to the mid-twelfth century. A range of different bone needles and a minimum of two bone awls were found at Wairau Bar excavations.[2] The needles included both flat and hollow examples, while one awl, made specifically to be used by a right handed person, has been identified as being made from the bone of the extinct eagle.[3] The awl could also serve as a needle holder; one was found with needles inserted into the hollow shaft, presumably kept in place with a plug of some fibrous material exactly as has been practised by Inuit sewers of clothing in North America.

Numerous needles are held in museums throughout the country. Canterbury Museum alone holds possibly as many as 400 bone needles or parts thereof and 300 bone awls in its collection, from a number of different South Island sites. Most of these artefacts appear to be bird bone, although some ethnologists in the early 1900s recorded that needles were made of enemy human bone for sewing dogskin cloaks.[4] In 2003, an initial selection of 100 needles from the Canterbury Museum collection was examined[5] but to date, no major analysis of Maori needles has been undertaken.

Regardless of their bone source, Maori needles are multiform. At least five different types have been identified to date. They include:

- large hollow needles up to 310 mm in length
- short hollow needles up to 100 mm long
- flat needles ranging between 80-150 mm long
- small slim round needles varying between 50-107mm long
- needles with straight shafts and with curved shafts
- kinked needles
- needles with scarfs cut into their length, at either the eye or the pointed ends
- needles with round eyes, grooved slotted eyes, two eyes at the pointed end

The sewing of different types of material requires needles of diverse shapes and sizes. This is reflected in the acknowledged categories of western sewing needles such as sharps, betweens, darners, crewel and tapestry, which comprise minor variations, when compared with bodkins, and traditional speciality needles such as beading, punch work embroidery, leather work, mattress, upholstery, carpet and sack-needles, which display greater modifications. The wide range of differently sized and shaped Maori needles shows that they were being made for a range of particular purposes.

Needles found at Whalers Bay Cave, near Kaikoura, are predominantly of two types; the first group being flat, the second being hollow, similar to, but much longer than those from Wairau Bar. The flat needles are between 80 mm and 150 mm long, cut longitudinally through sections of bird bone, giving them both convex and concave surfaces (Fig. 1). In contrast, some of the hollow needles from Whalers Bay are up to 250 mm in length. In the case of these large examples made from wing-bones of molly-mawk, the hollow nature of the bone was used to assist making the eye of the needle at one end where a portion of the bone was removed from one side. Opposite the removed section, the hole was drilled through the remaining single thickness of bone. The needle point was created by a slanted cut made across the other extremity (Figs. 2 and 3).

The design of this type of hollow needle reveals significant aspects of the level of Maori sewing technology. Firstly, it incorporates an important feature that facilitates sewing. The total width of the *threaded* needle cannot exceed the shaft of the needle. The design thereby eliminates the potential drag of sewing thread or fibre as it is pulled through the material being sewn. In addition, these hollow needles seem polished along the shaft to create distinct edges; a cross section would show their intentionally constructed quadrangular, rhomboidal, or triangular shape. These forms can be compared with the triangular cross-section of twentieth century fine metal needles, customarily used by furriers and glove makers. They argue that Maori may have been using these needles to sew leather-like materials.

Although similar needles of both varieties were found at South Bay, Kaikoura, other needles such as those found at Irongate Cave, south of Kaikoura, are much smaller, more highly polished, with very fine eyes. Clearly, they were designed for sewing finer materials which may have included bird-skins. Other needles with slotted eyes held in the Otago Museum collection may have had another purpose.

Yet another variation of needle has Chatham Island provenance. H D Skinner believed the long hollow needles of the Moriori were probably used in stitching seal skin cloaks, plaiting mats and thatching houses. He noted that all Moriori needles were similar in that the hole was drilled through only one side of the bone. However, unlike the Whalers Bay needles, some of these have a rectangular section cut out of the shaft of the

needle. Skinner believed that this was to enable the knot of the sewing thread to be contained within the body of the needle.[6] While his theory may be correct, there are other explanations that should be considered. In the sewing industry, the cut-out or shaping in the needle shaft is known as a 'scarf'; it is designed to assist in guiding the thread through the eye of the needle.

However Skinner's premise does not explain major differences in the needles he illustrated. One has two holes or eyes, in addition to the scarf, near the point of the needle. A second has the scarf cut near the eye of the needle at the opposite end to the point; this needle may have been used for a thicker textile, the length of shaft before the scarf giving enough purchase for the sewer to pull it through. The third is finer with a much smaller eye. These considerable differences suggest that all three needles were used for entirely dissimilar purposes. Further to this, other needles may yet be unrecognised; there are shapes that pose more questions, such as certain cloak pins and kinked needles (Fig. 4).

SEWING TECHNOLOGY

Both Moriori and Maori sewing at this time may not have been the continuous process of contemporary European practice. It is possible that sewing fibre was threaded through the eyes of a needle such as the first Chatham's example, then looped around the scarf, similar to the way yarn is carried in a crochet hook. With the thread attached this way, the point of the needle with its looped thread can be inserted into the textile, without requiring the needle to be pulled fully through, just as some awls are used today.

However, the friable nature of textiles means there is no longer any evidence of what material the early Maori at Wairau Bar were sewing, and the earliest known evidence comes from two discoveries in the lower South Island. The first of these comes from the analysis of the Lake Hauroko cloak made by David Simmons in the 1960s; the second from a cloak fragment included among findings made during excavations led by Atholl Anderson at Lee Island during the 1980s.

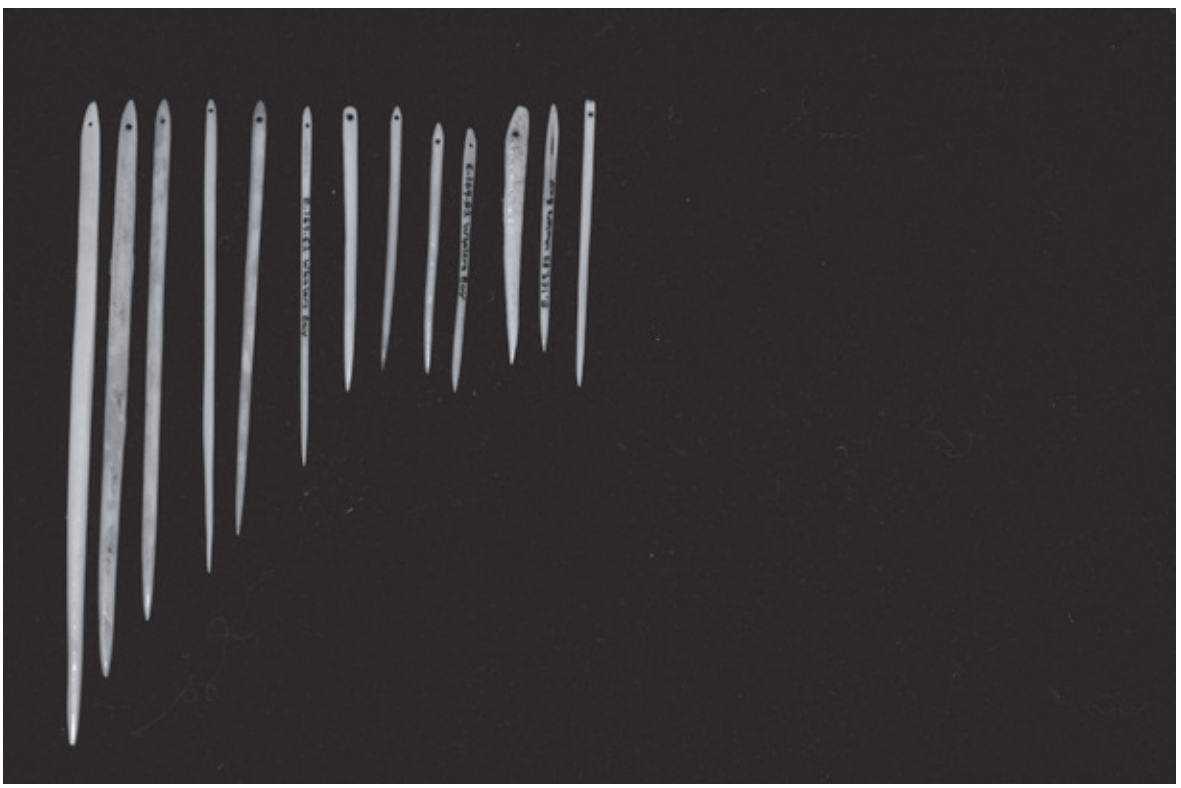

Figure 1. A selection of thirteen needles (E169.82) from Whalers Cave, Kaikoura. All made from split section of seabird long bone, the minimum length is 50 mm, maximum length 107 mm. All needles figured are from the collections of Canterbury Museum.

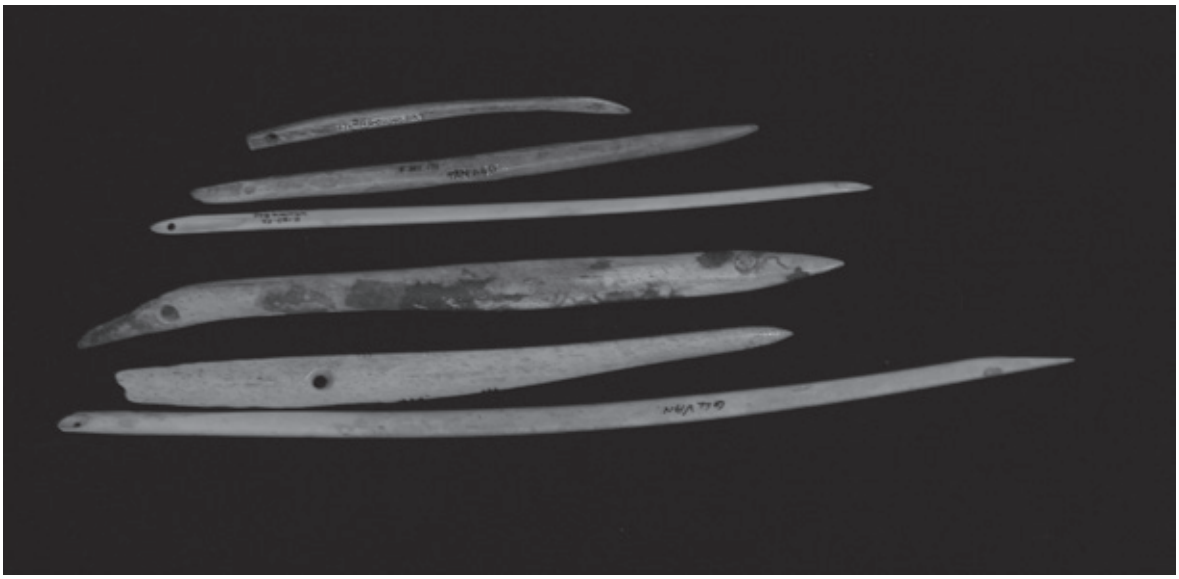

Figure 2. A selection of six various needles. From above: E199.2158 (Vangioni Collection 37) Banks Peninsula, split seabird long bone, length 117 mm, width 5.0 mm; E182.171 (Vangioni Collection 440) Banks Peninsula, mammal bone, length 175 mm, width 8.0 mm; E180.52 Whalers Bay, Kaikoura, albatross or mollymawk wingbone, length 220 mm, width 6.0 mm; E199.2186 (Vangioni Collection 65) Banks Peninsula, mammal bone, length 235 mm, width 11 mm; E80.3, Kaiapoi, mammal bone, length 175 mm, width 8.0 mm; E199.2185 (Vangioni Collection 64) Banks Peninsula, albatross or mollymawk wingbone, length 310 mm, width 8.0 mm.

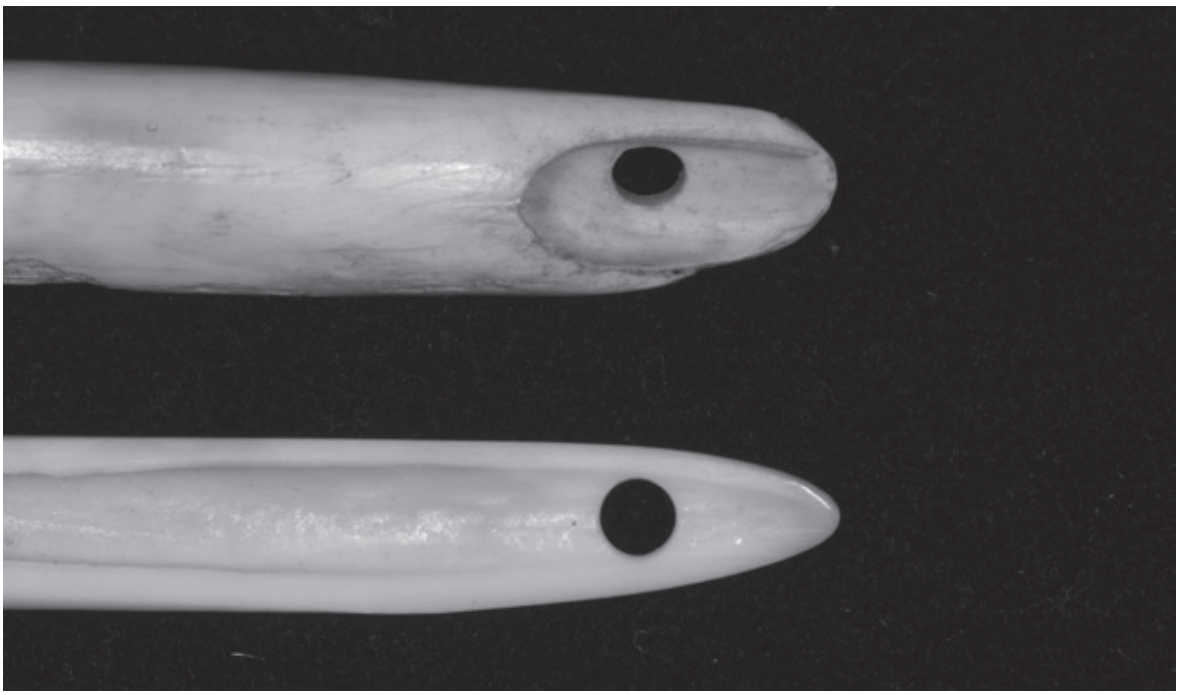

Figure 3. Enlargement of E199.2185 (above) and E180.52 (below) showing eye details of hollow and split bone needle construction. Both eyes 2.0 mm.

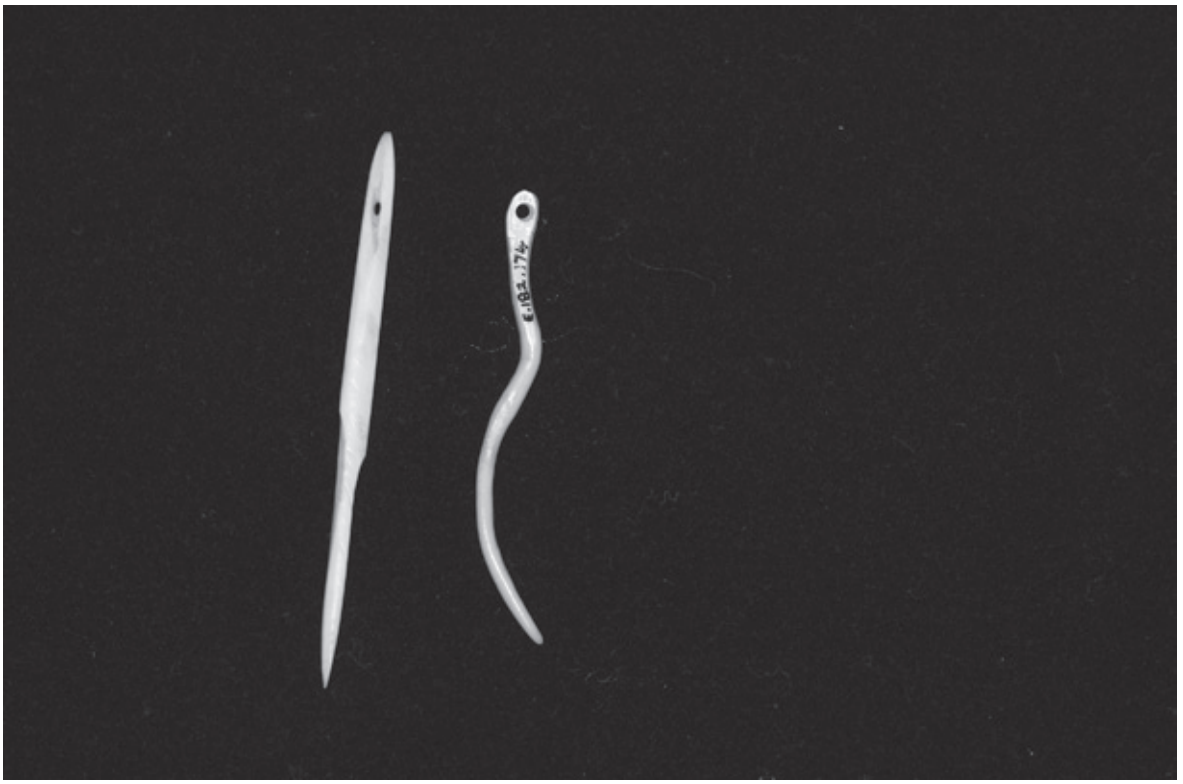

Figure 4. Two needles: (left) E169.83 Whalers Bay Cave, Kaikoura, split section bird long bone, length 67 mm, width 4.0 mm, thickness 2.0. Possibly unfinished, the eye shows a worked groove. (Right) E182.174 Whalers Bay Cave, Kaikoura, length 55 mm, width at midpoint 3.0 mm, raw material bone, source unknown. 'Kinked' needle with highly polished surface.

The cave burial site discovered on Mary Island in Lake Hauroko held the body of a woman who was wearing a cloak. Radiocarbon dating of other material in the cave indicated that this burial had probably taken place around the middle of the seventeenth century. Without removing her cloak, painstaking details of the garment were recorded that subsequently enabled a replica to be constructed. This item is now held in Otago Museum. Simmons recorded that the neck edge of the Hauroko cloak was covered with 30 mm wide strips of folded dog skin. He noted this was secured with half-hitches passing around the upper double weft threads and the skin. He also suggested that the dog-skin strips had probably formed part of a previous skin garment, based on the evidence of earlier stitching:

> … as the short edge of one of the strips still carries stitching identical in technique to that normally used for joining pieces of skin in a garment.[7]

Unfortunately, however, Simmons failed to clarify what the 'normally used' technique involved.

Similarly to the Hauroko garment, Anderson described the Lee Island fragment as having a binding strip of dogskin fixed along the top edge of the largest piece of the cloak. He stated this was held in place by half-hitching, using a two-plied yarn.[8] This description suggests that like the earlier finding, the binding may have been at the neck edge. However, in both the Lee and Mary Island items, the attachment of dog-skin bindings or facings by a 'looped' thread or half-hitch process is significant. It is impossible to know precisely how the process was accomplished; whether the thread was manipulated by fingers alone, or an impliment was employed to manoevre the thread. As such, the latter could be argued to be a precursor to blanket stitching, and thus an early form of Maori sewing.

Evidence suggests the practice was continued. On Cook's second voyage, Johann Reinhart Forster recorded the purchase of a maro, 'faced' with dog skin (Roth 1923). Likewise, several cloaks were described as being

'faced' with dog skin. It is not exactly clear what these eighteenth century writers had in mind when they used this term. When used in current clothing terminology, the attachment of a 'facing' is a technique used to cover, and to stabilise a raw edge of cloth. Thus, a 'facing' is found at an edge of a garment, as for example, around the neck or at the waist. It is typically constructed by attaching a strip of self fabric or some suitable alternative to the outer edge of the item. The attachment is usually folded over the raw edge of the garment, to enclose it, or to 'bind', 'back' or 'line' it, thereby concealing the original raw or rough edge.

USE OF BIRDSKIN

Traditional evidence tells of garments of bird skin and seal skin, as well as of dog skin. It is probable that skins of all the larger ground birds were utilised in this way. The kakapo was one such species. The Reverent Mr John Stack documented the tradition of a group of Ngai Tahu chiefs travelling south from Kaiapoi, each claiming areas of land to provide girdles or kilts of kakapo for their daughters.[9] Expressing further usage for clothing purposes, the words of a waiata recorded by Governor Sir George Grey in 1853 include the lines:

> Me kauhi raanei koe,
> Ki te huruhuru kaakaapoo puu mai o te tonga.[10]

In 1969, Hirini Mead translated this:

> Shall you be laced up
> In a kakapo feathered cloak originating from the south.[11]

The notion of 'lacing up' conveys a technique of fastening with thonging or fibre, which is investigated below. Further reports noted of the use of kakapo skins. Elsdon Best recorded that in 1882 Te Whiti had spoken of expeditions travelling to the South Island to obtain kakapo skins for garments.[12] These garments were defined by Best as dress-capes worn over the shoulders (kahu kakapo). None of these garments appear to exist today. The only known kakapo cloak has feathers attached, rather than skins; now held in the Perth Museum, Scotland, it also has woollen elements which reveal it as a post-contact garment.

Kiwi skins were used in a similar manner. In 1824, when the French corvette *La Coquille* visited the Bay of Islands, Lesson recorded this use, noting that Maori hunted kiwi with dogs and made cloaks of them by sewing several skins together.[13] As with the kahu kakapo, no such stitched kahu kiwi are known today, but weka skins provided another potential source of stitched clothing.

TYPES OF SEAM

In 1881, some joined weka skins were found in a schist cave burial site of a woman and child on the Strath Taieri plains.[14] Augustus Hamilton described them:

> The edges of the skins were folded down about an eighth-of-an-inch, and oversewn from the back with thin twisted flax twine. Over one of these seams on the front I found a narrow strip of skin, placed apparently to cover the join, very much decayed, three inches long by a quarter-of-an-inch wide but still carrying a dark-grey down, and five or six double-shafted feathers of the moa. They were much moth-eaten and became detached from the skin during examination.[15]

Although Elsdon Best never examined this material, he heard of it, but clearly doubted Maori ability to have created garments in this way. He wrote:

> South Island natives appear to have made capes by sewing together skins of weka, the threads being passed through the turned up edges of the skins, apparently, but the description received is not very clear; probably the skins were fastened to some form of woven groundwork.[16]

Best's proposition was incorrect. Now in Otago Museum, four of the five original pieces of weka skin (D10.172a and b) were re-examined in May 2000. They show every indication of having once been part of a larger garment. The pieces were clearly part of a carefully planned whole. The skins were cut into rectangular shapes and laid side by side so that the wing holes would have been in line. However, contrary to the assertion of Hamilton, the seam was not 'oversewn' but used a form of knotted blanket stitch. The edge of one skin showed evidence of a later, unskilled attempt at repair, made with a narrow strip of unprepared flax leaf.

The knotted blanket stitch is superior for making a seam of this type because unlike the simple or common blanket stitch, it does not slip or loosen during the stitching process. Variations of the knotted stitch are known in European embroidery, but without undoing a museum specimen the exact Maori process cannot be determined.[17]

Otago Museum holds further evidence of Maori sewing. The same knotted blanket stitching is also found on several dog-skin artefacts from the region. One pelt (D10.175) currently comprises three pieces stitched together. Two pieces were joined with plied whitau

fibre, having stitches 4–6 mm apart, with one end of the thread worked neatly back through the stitched seam. This specimen is particularly significant because it shows this garment was important enough to its owners to be mended on more than one occasion. At one edge, five lines of stitching indicate repairs made in this area. The repairs vary in length from 70 mm to 125 mm, and are sewn with threads of plied whitau strands. The colour and thickness of strands suggest three different threads, but all repairs use the same sewing technique. None of the three threads match that initially used to join the original pieces of skin. This artefact provides the first conclusive evidence that Maori repaired skin garments.

Conversely, the huru kuri (A 79.966.) held in the collection of Te Puke Ariki, Taranaki, is stitched in an entirely different manner. Now the only known one of its kind in the world, this cloak is made of eight dog pelts stitched together.[18] The stitches are made of kuri thong (dog-skin thong) about 15 mm apart. The seam is very strong, made by butting two folded edges of skin together, then joining them by sewing through the total four layers of skin. There is currently no known Maori name for this seam, which consists of two lines of stitching on one row, through the same holes. This result can be achieved by making a single row of running stitches, then doubling back and filling in the spaces. However, because the stitching holes enclose the leather thronging so efficiently, it seems quite probable that two needles were used in opposing directions at the same time, in order to create a compact seam. This, in turn, may indicate the 'lacing up' of the kakapo waiata.

USE OF SEALSKIN

Maori used a much finer version of the same seam to sew seal skin. In 1913, a roughly rectangular piece of seal skin (MHE 23.2.) was presented to Auckland War Memorial and Museum. It had been found with the mummified body of a woman in a cave in Te Kuiti, but no additional evidence appears to have been documented about the site.[19] The skin has a narrow, double row of holes, about 2.5 mm apart, running around three of its sides; close examination reveals that it had been folded between those holes. Although no positive evidence of fibre remains, it is clear that the piece was once part of a larger item, very possibly a garment that was originally joined by the same type of seam as the Taranaki huru kuri. Its partial state suggests that this may have been a remnant of an old garment, perhaps symbolically laid to rest with a high-ranking, respected individual. It would seem that this article may have predated Cook by some generations, as the Cook journals all state they saw no evidence of Maori using seal skin.

HAWAI'IAN SEAM

This seam is not widely used. The only other example located to date, that replicates the folded textile in the same way, is shown by Simon Kooijman in his work T*apa in Polynesia*.[20] According to Kooijman's evidence, this type of seam was one used in Hawai'i for sewing layers of tapa cloth for kapa moe (barkcloth sleeping covers). This detail is potentially very exciting; it raises the question of whether both Maori and Hawai'ians brought existing knowledge with them, or whether they each developed it independently.

CONCLUSIONS

In all previous research of Maori clothing, the technical complexities of sewing have been completely ignored. Hamilton's examination of the Otago weka skins was cursory. Although Best documented kahu kuri, recognising that strips of dog skin were attached by sewing, he never saw the weka skins referred to by Hamilton, and apparently doubted that Maori had a sewing technology capable of stitching skins together without the support of a woven base underneath. Similarly, Anderson and Simmons apparently failed to recognise the significance of Maori stitching techniques. In contrast, this paper has established that Maori employed a range of sewing skills, developed over a period of time. It has produced previously unrecognised evidence of Maori sewing technology in identifying two distinctively different stitching techniques and types of seam; and shown that Maori created a variety of needles to meet specific needs.

However, this paper also offers the challenge of continuing research to rediscover what those particular needs were and the accompanying technologies that were practiced. It is hoped to begin by creating a data base of needles, at first in Canterbury, but ultimately throughout the nation – of numbers, sizes, shapes, and the localities in which they were found – which might help disclose what was being sewn with them. There are possible sewing links within other Pacific cultures. Further challenges include learning how Maori treated bird and dog skins in order to use them. Although a

certain amount of work can be accomplished within New Zealand, it is probable that the best way to recover this technology will be by connecting with other indigenous cultures, such as North American First Nation and Inuit peoples, and the Sami of Norway and Sweden to look for future leads of possible Maori procedures. It will require research funding and people who are keen to recover the ethnotechnology of Maori material culture and intellectual practice.

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